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RESEARCH AND ANALYSIS OF THE AMERICAN DOMESTIC GOVERNMENT WORKING DOG INDUSTRY

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RESEARCH AND ANALYSIS OF THE AMERICAN DOMESTIC GOVERNMENT WORKING DOG INDUSTRY

December 2020

By: **Jason D. Passarella**
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For the past several decades, the federal government has faced a chronic shortage of domestically bred working dogs qualified for use by both the Department of Defense and other federal agencies. As adversaries, both peer and near-peer, become more adept in circumventing detection systems, the need for working dogs has steadily increased to address security vulnerabilities. Unlike current technology, canines possess the ability to continuously adapt and provide a consistent detection capability. The lack of a robust domestic supply of working dogs creates increased supply chain risk and may threaten the ability of departments and agencies that utilize working dogs to maintain readiness if the supply from foreign markets is contested or interrupted for an extended period. This research draws on data from across the federal government and utilizes a mixed methods approach that applies both quantitative and qualitative techniques to obtain insight into the domestic working dog market. This paper provides the most comprehensive research on working dog procurement conducted in the last 15 years and offers a valuable methodology for uncovering and understanding opaque or emerging markets. The application of these concepts can lead to better outcomes for procurement decision makers and greater value for the taxpayer.

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RESEARCH AND ANALYSIS OF THE AMERICAN DOMESTIC GOVERNMENT WORKING DOG INDUSTRY

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Submitted in partial fulfillment of the
requirements for the degree of

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RESEARCH AND ANALYSIS OF THE AMERICAN DOMESTIC GOVERNMENT WORKING DOG INDUSTRY

ABSTRACT

For the past several decades, the federal government has faced a chronic shortage of domestically bred working dogs qualified for use by both the Department of Defense and other federal agencies. As adversaries, both peer and near-peer, become more adept in circumventing detection systems, the need for working dogs has steadily increased to address security vulnerabilities. Unlike current technology, canines possess the ability to continuously adapt and provide a consistent detection capability. The lack of a robust domestic supply of working dogs creates increased supply chain risk and may threaten the ability of departments and agencies that utilize working dogs to maintain readiness if the supply from foreign markets is contested or interrupted for an extended period. This research draws on data from across the federal government and utilizes a mixed methods approach that applies both quantitative and qualitative techniques to obtain insight into the domestic working dog market. This paper provides the most comprehensive research on working dog procurement conducted in the last 15 years and offers a valuable methodology for uncovering and understanding opaque or emerging markets. The application of these concepts can lead to better outcomes for procurement decision makers and greater value for the taxpayer.

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LIST OF ACRONYMS AND ABBREVIATIONS

341 TRS	341st Training Squadron
AFB	Air Force Base
AFICC	Air Force Installation Contracting Center
AFIMSC	Air Force Installation and Mission Support Center
AKC	American Kennel Club
BAA	Buy American Act
BPA	Blank Purchase Agreement
CIR	Category Intelligence Report
CMT	Category Management Team
DHS	Department of Homeland Security
DOD	Department of Defense
DoJ	Department of Justice
DoS	Department of State
DPC	Defense Pricing and Contracting
EO	Executive Order
FAR	Federal Acquisition Regulation
FCM	Federal Category Management
FPDS–NG	Federal Procurement Data System–Next Generation
FY	Fiscal Year
G2B	Government-to-Business
GAO	Government Accountability Office
GWD	Government-Wide Working Dog
HAF/A4S	Headquarters Air Force/Director of Security Forces
IED	Improvised Explosive Device
IRB	Institutional Review Board
IDIQ	Indefinite Delivery Indefinite Quantity
IT	Information Technology
MWD	Military Working Dog
OIG	Office of the Inspector General
OMB	Office of Management and Budget

PSC	Product Service Code
RFI	Request for Information
SAM	System for Award Management
TSA	Transportation Security Administration
WWI	World War I
WWII	World War II

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I. INTRODUCTION

Working dogs are an invaluable resource that protect troops from weapons that even some of the military's best equipment cannot detect. *USA Today* recounted the experience of one working dog handler on a routine patrol in Afghanistan in 2012 (Ganzert, 2018). U.S. Air Force Staff Sergeant Len Anderson was just about to step on an improvised explosive device (IED) when his military working dog, Azza, alerted him to the danger and ultimately saved his life. According to *USA Today*, later in the same patrol, Azza detected a remotely activated IED just before detonation, preventing Anderson from traveling too far into the blast radius and receiving mortal wounds.

For more than 30 years, the federal government has faced a shortage of domestically bred working dogs qualified for use by both the Department of Defense (DOD) and other federal agencies (Federal Category Management [FCM], 2019). According to the *U.S. Government-Wide Working Dog (GWD) Category Intelligence Report (CIR): Decision Brief*, about 93% of working dogs across all U.S. government agencies are imported from European markets and are not bred domestically (FCM, 2020). Dr. Cynthia Otto, a veterinarian who specializes in working dogs at the University of Pennsylvania School of Veterinary Medicine (PennVet), testified to Congress that the demand for bomb-sniffing canines trained to detect bombs, drugs, and more has led to a shortage of dogs across Europe (States News Service [SNS], 2016). James Lyle, who has been selling combat dogs to the U.S. military and the Department of Homeland Security (DHS) for over a decade, claimed that "the DOD is competing for a scarce and valuable resource when it shops overseas" (Bittle, 2020, para. 13). He added that countries such as China, Russia, and Saudi Arabia also source canines for their military forces from the same well-established kennels in Europe (Bittle, 2020). As terrorists become more sophisticated in circumventing detection technology systems, the need for dogs has steadily increased to address security vulnerabilities (Battaglia, 2017, p. 178). The nose of a detection canine continues to be one of the best tools in support of modern societies' national security (Battaglia, 2017, p. 178).

A. STATEMENT OF THE PROBLEM

The lack of a robust domestic supply of GWDs creates increased supply chain risk and may threaten the ability of departments and agencies that utilize working dogs to maintain readiness if the supply from foreign markets is contested or interrupted for an extended period.

B. PURPOSE OF THE STUDY

The Air Force Installation Contracting Center (AFICC) sponsored this research. Our research questions are, What are the factors affecting the domestic supply of working dogs, and what actions can the federal government take to improve the domestic supply of working dogs?

C. OVERVIEW OF THE STUDY

After a review of the available literature, we utilized a mixed methods approach by applying both quantitative and qualitative techniques. We applied business intelligence methods such as spend analysis and interview to gather information about the domestic market of working dogs and understand the behaviors of the stakeholders. We utilized attribute mapping and an expert working group to lay out the process of synthesizing and aggregating the data to visualize and better define the market. These methods allowed us to develop strategies to achieve the objectives of this research.

D. BACKGROUND INFORMATION ON WORKING DOGS

These methods allowed us to develop strategies to achieve the objectives of this research. In this chapter, we provide a general history of the use of working dogs, a review of the progression of working dog procurement since World War I (WWI), and an overview of the current state of the government-wide working dog program.

1. General History

From their earliest mention in the annals of history, working dogs have provided vital support to their handlers. Ancient records detail the use of working dogs by Alyattes, king of Lydia (circa 600 B.C.), when he took the field against the Cimmerians and used a

"number of large and fierce dogs" (Forster, 1941, p. 114) to fall on the invaders, tearing many of them to pieces and putting others to flight. During WWI, the U.S. Army employed an unofficial canine war force for use as messengers and early warning detection against incoming artillery or mustard gas (Ainsworth, n.d.). As the United States entered WWI without any dogs in inventory, these dogs were primarily procured from the French and the Belgians at a rate of approximately 500 dogs every three months (Frost, 1990, p. 14). Other countries, such as Germany, utilized dogs extensively as an organized and specially trained force multiplier—supporting infantry operations as messengers, scouts, guard dogs, and transporters (Frost, 1990, p. 14). At the entrance of the United States into World War II (WWII) in 1941, the U.S. military was unprepared to utilize working dogs in combat roles since the inventory was comprised of only sled dogs (Frost, 1990, p. 14).

Despite indications that using patrol dogs significantly decreased patrol casualties, the U.S. military maintained only a token force of dogs during the Korean War (Frost, 1990, p. 16). Unlike the Korean War, the conflict in Vietnam saw the extensive use of dogs for combat tracking, mine discovery, tunnel exploration, and scouting missions (Frost, 1990, p. 16). In the more recent past, the military has utilized an array of government- and contractor-owned dogs to detect illegal drugs and explosives (mines, munitions, and IEDs), search caves and bunkers within Iraq and Afghanistan, and search ships when boarding at sea (Battaglia, 2017, p. 180; Rolfe & Toffoli, 2006). Notwithstanding these varied and successful applications of military working dogs, the U.S. military has been inconsistent in its execution of working dog programs and has drastically reduced its inventory levels and diffused its internal expertise following each major conflict over the last century (Frost, 1990, p. 17).

2. Progression of Working Dog Procurement since World War I

The sources of supply and the responsibility for procurement of working dogs have changed and evolved since their first use by the armed forces during WWI. During the Great War, most dogs used by the American Expeditionary Forces came from their allies, as stated previously (United States War Dogs Association, n.d.-a). While the Allied forces (France, Britain, and Belgium) entered the war with upwards of 20,000 dogs against

Germany's inventory of 30,000 dogs, America's military planners in Washington determined that the anticipated short duration of the war did not necessitate the purchase of dogs stateside (United States War Dogs Association, n.d.-a). Sergeant Stubby, a stray dog found by Private J. Robert Conroy during training and taken to France, represented a small portion of war dogs that came from the United States to serve in Europe with American troops (Smithsonian National Museum of American History, n.d.). Serving in the famed Yankee Division, Stubby distinguished himself through actions such as warning soldiers of an incoming gas attack, locating wounded soldiers, and catching a German spy (Smithsonian National Museum of American History, n.d.). He, along with other returning war dogs, was hailed as a hero by the American public (Smithsonian National Museum of American History, n.d.). Despite the public popularity of dogs such as Sergeant Stubby, no formal canine program was organized due to the small size of the U.S. Army during the 1920s and 1930s (Watson, 2019).

After the reduction in working dog inventory during the interwar years, and with the threat of another world war on the horizon, the Army was heavily influenced by enthusiastic civilian organizations composed of dog owners and breeders along with a small cadre of military members who saw the advantages that dogs could bring to the common soldier (Frost, 1990, p. 14; Waller, 1958, p. 3). Dog fanciers (those with a special interest in dogs), along with the prominent domestic dog organizations, developed training techniques with military applications (Waller, 1958, p. 3). With America's sudden entrance into WWII, a private organization called Dogs for Defense Inc., a clearinghouse for coordinating the various efforts around the developing interest in military applications for canines, offered to assume the role of gathering, training, and donating dogs to the Department of War (Waller, 1958, p. 5). Dogs for Defense had partnered with the American Kennel Club (AKC), the registration body for all purebred dogs, to organize the private sector in support of the war effort (Waller, 1958, p. 5). This partnership between private organizations—which initially handled all canine procurement and training—and the Army provided a stable means of obtaining quality working dogs with limited investment from the government (Waller, 1958, p. 5).

Despite initial issues in developing a sound training program, the Department of War instructed the Army quartermaster general to expand the dogs' mission from solely fixed sentry work at civilian production plants to include Army airfield guard duty, roving patrol, messenger roles, and sled work (Waller, 1958, p. 4). The responsibilities of the quartermaster general for training and procurement increased to also manage handler instruction, development of training techniques, and the establishment of schools capable of rapid expansion (Waller, 1958, p. 6). In the fall of 1942, the Quartermaster Corps was made responsible for procuring and training canines for the Navy and the Coast Guard to support beach patrols and sentry duty at Navy facilities (Waller, 1958, pp. 6–8). At the same time, the quartermaster general launched the War Dog Program (colloquially known as the *K-9 Corps*) and established war dog reception and training centers to receive animals procured by Dogs for Defense and provide all necessary examination, classification, and training as required (Waller, 1958, p. 8). This also established the Quartermaster Corps as the sole agency providing trained dogs to military and other federal agencies (Watson, 2019). In March 1945, Dogs for Defense asked to be relieved of its responsibility as the procuring agency for the Quartermaster Corps, as the domestic situation near the end of the war had improved dramatically (Waller, 1958, pp. 13–14). Dogs for Defense had, within 3 years, procured approximately 18,000 dogs through donation, of which just over 10,000 finished training (Waller, 1958, p. 14). In response, the Quartermaster Corps established its own organization for dog procurement and, following the war, discontinued the practice of receiving dogs "on loan" from citizens in favor of government purchase, as the cost of returning dogs who did not successfully complete training became prohibitive (Waller, 1958, p. 51).

While the Army's need for working dogs decreased following the Korean War, needs within the Air Force grew to support various security missions, which resulted in the Air Force assuming responsibility for working dog procurement from the Army in 1964 (Frost, 1990, p. 17; Waller, 1958, p. 62). The Air Force soon tightened the requirements for working dogs in response to receiving over 1,500 mail and telephone offers for working dogs per month (Frost, 1990, p. 17). Additionally, in contrast to the Army's distributed approach to training facilities during WWII, the Air Force centralized its procurement,

logistics, and training facilities in one location (Frost, 1990, p. 18). With the selection of Lackland Air Force Base (AFB) in San Antonio, TX, and with the formation of Detachment 37, the Air Force hoped to create a more efficient and unified organization to develop the DOD Dog Program (Frost, 1990, p. 18). In 1971, at the height of the conflict in Vietnam, Detachment 37 transitioned to become the DOD Dog Center (Frost, 1990, p. 18).

With the end of hostilities in Vietnam, the DOD's requirement for working dogs declined significantly, but demand increased from non-DOD government agencies like the Department of Justice (DoJ), the Department of Transportation, and the Treasury Department (Frost, 1990, p. 19). The DOD Dog Center utilized mobile buying teams to handle the increased demand for drug and explosive detection dogs required throughout the federal and civilian law enforcement agencies (Frost, 1990, p. 19). Additionally, the DOD Dog Center accepted dogs that were shipped to Lackland AFB if they had passed preliminary examination by a military or civilian veterinarian (Frost, 1990, p. 19). This practice continued through 1984, when the domestic supply of acceptable dogs was considered inadequate for the increased demand (Frost, 1990, p. 19). To address the shortage in domestic supply, the Air Force sent mobile buying teams to Western Europe to access the ample available supply of working dog stock in West Germany, Holland, and Belgium (Frost, 1990, pp. 19–20). While the infusion of stock addressed the immediate supply backlog and introduced the Belgian Malinois to American handlers, the high rejection rates (25%–50%) of the imported dogs dispelled the apparent advantages of this "European solution" (Frost, 1990, p. 20).

The U.S. military faced conflicts in Somalia, Haiti, and the Balkans throughout the 1990s and large-scale operations in Afghanistan and Iraq throughout the 2000s (Beck et al., 2019). These expanded conflicts increased the need for working dogs and showed that the previous procurement methods were inadequate to satisfy demand (Beck et al., 2019). While the Air Force continued to purchase the majority of its working dogs in Europe, some federal government agencies attempted to develop breeding programs to satisfy demand, while others were forced to acquire dogs from shelters (Battaglia, 2017, p. 179). Over the past several decades, various agencies within the U.S. federal government, such as the Transportation Security Administration (TSA), Customs and Border Protection, U.S.

Customs Service, and the U.S. Army, have initiated independent breeding programs (Leighton et al., 2018). In each of these cases, the breeding programs were either disbanded or dramatically reduced due to funding cuts (Battaglia, 2017; Leighton et al., 2018). The Air Force eventually established its own breeding program in 2002, which is still in operation at Lackland AFB (Beck et al., 2019).

In 2006, the secretary of the Air Force was designated as the DOD executive agent for military working dog resourcing, training, utilization, and final disposition and was given full responsibility over the DOD Military Working Dog (MWD) program (DOD, 2011). The secretary of the Air Force delegated these duties to Headquarters Air Force/ Director of Security Forces (HAF/A4S). To manage the program, HAF/A4S appointed a DOD MWD program manager (PM). The Air Force's responsibilities were expanded in 2018 when it was appointed as the GWD subcategory team lead with responsibility to research and analyze the working dog program requirements for all participating government agencies as well as industry and academia capabilities (FCM, 2020). In addition to managing the program, the DOD MWD PM develops policy and provides guidance to service component PMs, DOD police agencies, and the 341st Training Squadron (341 TRS). The 341 TRS acquires, evaluates, trains, accounts for, distributes/ redistributes, and provides distribution instructions with assistance from the 502nd Contracting Squadron, which manages procurement.

3. Current State of the Government-Wide Working Dog Program

Throughout history, dogs have performed critical roles in support of the security of the United States and its citizens. Today, as acts of terrorism such as mass shootings and bombings in schools, train stations, and other public places rise, these canines perform a much more sophisticated and specialized set of tasks (Leigh, 2018). These roles were recently described to the Committee on Homeland Security as follows, according to House of Representatives Report No. 115–488 (2018, p. 3):

> Canines serve a variety of roles in the Federal Government's national security infrastructure, including detecting concealed humans, narcotics, currency, firearms, electronics, chemicals associated with weapons of mass

destruction, and prohibited agricultural products, and in search and rescue missions.

The surge in terrorist activities worldwide has steadily increased the demand for working dogs (Battaglia, 2017, p. 178). Sheila Goffe, vice president of government relations for the AKC, said in her testimony before a congressional committee in support of the Domestic Explosives Detection Canine Capacity Building Act of 2017, “Since the terrorist attacks on 9/11, and subsequent attacks worldwide, global demand for high-quality, explosives-detection dogs has skyrocketed” (Leigh, 2018). As mentioned previously, China, Russia, Saudi Arabia, and other foreign powers are also in competition for the limited supply of high-quality canines from European markets (Bittle, 2020; SNS, 2016). Scott Thomas, former TSA Canine Breeding and Development Center manager, reported his astonishment that despite the large number of domestic breeders, the federal government continues to struggle to meet demand (Leigh, 2018). Speaking within the context of offshoring government’s critical requirements, Thomas stated, “The irony is that, as a nation, we do not typically outsource the production of resources needed for national security” (Leigh, 2018, para. 4). Although we agree with his statement, canines are still not considered a formal weapon system and a part of the defense industrial base. Many domestic canine breeders have the capability to produce exceptional working dogs; however, the government’s procurement process and requirements continue to create barriers to entry for American breeders and vendors (Domestic Explosives Detection Canine Capacity Building Act, 2017; Leigh, 2018).

The federal government currently maintains approximately 5,000 working dogs across four departments: DOD (32%), DHS (58%), DoJ (5%), and Department of State (DoS, 5%) (FCM, 2020). However, only 7% of the total inventory across all U.S. government agencies are bred domestically, and the rest are imported from European markets (FCM, 2020). To offset some of its dependence on sourcing canines abroad, the DOD maintains a breeding program located at Lackland AFB that produces approximately 12% of the DOD’s yearly working dog replacement requirements (FCM, 2019). However, the throughput of the program is significantly lower than the breeding program’s overall goal of providing at least one-third of the DOD’s working dog requirements (Sanchez,

2012). Moreover, despite the apparent shortage of working dogs in the United States and the declining supply from Europe, the federal government aims to grow its inventory by at least 20% in the next 3 years (FCM, 2020).

E. CONCLUSION

The reliance on the European solution, as described by Frost (1990), continues today as buying teams travel to Western Europe to procure dogs in significant quantities (FCM, 2020). Frost addressed the complexities of the working dog and its usage by stating,

> The dog has had a long and distinguished association with man, but … the American military continually reinvents the wheel each time a crisis develops and it is realized that the dog could help. The U.S. Military has not been consistent in its development of an effective working dog program. (Frost, 1990, p. 21)

Additionally, in the conclusion to his study of the lessons learned on the use of working dogs on the battlefield, Michael Hammerstrom (2005) articulated the procurement of working dogs as a perennial issue that continues today:

> Procurement of animals with the required qualities is a continual problem. Since the programs are not continually maintained, an adequate and consistent procurement system is not kept in place. No program has had the quality or numbers of dogs, handlers, or trainers needed once the military leadership decides to once again use dogs in combat. (p. 30)

The various departments of the federal government, which procure working dogs to support their individual missions, look to the DOD for direction as the DOD, specifically the Air Force, acts as the category manager for the GWD program. The DOD's inconsistency in managing and maintaining a robust MWD program inhibits a cohesive whole of government approach to working dog procurement.

We turn to a review of literature on the defense industrial base, the concept of reshoring, and a review of category management and some of its associated tools. With an understanding of the factors affecting the domestic supply of working dogs and the courses of action available to the federal government, adjustments can be made to the GWD program to improve the domestic supply of quality working dogs available to meet national security missions.

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II. LITERATURE REVIEW

After an exhaustive search of the available literature for work that specifically addresses our research question, we have been unable to locate any academic research specific to public procurement barriers in the working dog market. While comprehensive research that investigates and provides suggestions to improve U.S. working dog programs has been conducted by scholars such as Frost (1990), Murray (1998), Whelan (2001), and Hammerstrom (2005), no research that we were able to locate addresses and analyzes procurement barriers that impact the domestic supply chain of working dogs. Despite this dearth of literature directly applicable to our research question, we did uncover some tangentially related literature, which includes a Government Accountability Office (GAO) report (Office of the Inspector General [OIG], 2000) that addresses procurement practices for working dogs and a perspective article (Leighton et al., 2018), which provides a suggested framework for a public–private breeding cooperative. There is also a wealth of information addressing medical practices and the impact of genetics for and on working dogs. This medical information is outside the scope of our research and therefore is not addressed. There has been limited work by the GAO and academics to address sourcing concerns related to working dogs in America. Following this brief review of the related research, we turn to a review of literature on the defense industrial base, the concept of reshoring, and a review of category management and some of its associated tools. This literature review provides insight into the federal acquisition system and methods that inform our approach to address the sourcing challenges facing the modern American GWD market.

A. RELATED RESEARCH

Following, we review a GAO report on working dog procurement by the DOD and a perspective article focused on a potential solution to the domestic shortage of working dogs.

1. Government Accountability Office Report

At the request of Representative Lamar Smith (R-TX), in 2000, the GAO conducted an audit of the Air Force's contracting practices to procure working dogs (OIG, 2000). The review addressed accusations that the procurement practices of the 341 TRS, which is tasked with procuring working dogs for the DOD and other federal agencies, violated Section 10a, Title 41 of the United States Code (41 U.S.C. 10a), which is commonly referred to as the Buy American Act (BAA). The BAA requires that preference should be given to domestically produced or manufactured products (OIG, 2000). According to the Federal Acquisition Regulations (FAR), one of the exceptions to the BAA was the availability of a sufficient quantity of quality working dogs produced in the United States (FAR 25.103[b]). The allegations were not substantiated, as the number of quality working dogs available domestically was not sufficient to meet DOD requirements (OIG, 2000). As detailed in our findings, this dearth of domestic working dogs has yet to be overcome.

2. Detector Dog Center of Excellence

A group of researchers published a perspective article in the journal *Frontiers in Veterinary Science*, in which they describe a proposed solution to address the reliance on foreign-bred sources to supply working dogs (Leighton et al., 2018). They proposed the establishment of a nongovernmental Detector Dog Center of Excellence to oversee the entire working dog process, including breeding decisions, purchases of dogs from breeders, and final sale to the government as an approved vendor (Leighton et al., 2018). Additionally, they proposed utilizing a data-driven approach to breeding decisions and the establishment of a working dog semen bank to drive advances in research to define, understand, and develop quantitative traits for odor detection capability (Leighton et al., 2018). Some of these suggestions are reminiscent of the Dogs for Defense organization, which facilitated the transfer of canines to the U.S. military throughout most of WWII (Waller, 1958). While this article appears to be closely related to our research, the authors focus on a way to improve the government's working dog program but do not academically address the reasons behind procurement barriers inhibiting full market participation.

Moving forward, we present the core of our literature review. The information in this review motivates and primes our research methodology.

B. DEFENSE INDUSTRIAL BASE

In the 2017 National Security Strategy, President Donald J. Trump stated,

> A healthy defense industrial base is a critical element of U.S. power and the National Security Innovation Base. The ability of the military to surge in response to an emergency depends on our Nation's ability to produce needed parts and systems, healthy and secure supply chains, and a skilled U.S. workforce. (Office of the President of the United States, 2017, p. 29)

The defense industrial base is identified as a critical infrastructure sector by the DHS that enables research and development, design, production, delivery, and maintenance to meet U.S. military requirements (Office of the Under Secretary of Defense for Acquisition and Sustainment [OUSD(A&S)], 2020). The DOD depends on its suppliers to provide a multitude of different products or supplies, from complex platforms like missiles, tanks, or surveillance equipment, used only for military applications to relatively simple items available to the general public (Peters, 2018). In addition to supplies, the DODs needs extend to services ranging from simple janitorial services to complex advisory and assistance support for cutting edge research and development (Peters, 2018). The firms that make up the defense industrial base are essential in supporting the DOD's mission "to provide the military forces needed to deter war and to protect the security of our country" (DOD, n.d., para. 1).

On July 21, 2017, President Trump signed Executive Order (EO) No. 13,806, which required the secretary of defense, in coordination with an interagency team, to assess and create a plan to strengthen the U.S. defense industrial base and the resiliency of its supply chain (McCormick, 2018). The EO stated that "the loss of more than 60,000 American factories undermines the capacity and capabilities of United States manufacturers to meet national defense requirements and raises concerns about the health of the manufacturing and defense industrial base" (Exec. Order No. 13,806, 2017, para. 3).

In a report to President Trump by the interagency task force, in fulfillment of EO No. 13,806 (2017), the DOD advised, "To provide for our national security, America's

manufacturing and defense industrial base must be secure, robust, resilient, and ready" (DOD, 2018, p. 7). Additionally, the report detailed that "many sectors continue to move critical capabilities offshore in pursuit of competitive pricing and access to foreign markets" (DOD, 2018, p. 3). The EO was mainly focused on manufactured items; however, the issues brought up are similar to what the DOD experienced with the increase in global demand for canines after 9/11. Although working dogs are not an official part of the current defense industrial base, the low domestic production capacity of working dogs threatens some of the government's capabilities to provide national security. One of the recommendations presented in the EO is to diversify the supplier base in sectors in which the United States is highly dependent on foreign suppliers and may be at risk if a politically induced break in the supply chain occurs (McCormick, 2018).

In light of the global COVID-19 pandemic, the list of applicable risks to supply chains may be expanded from just politically induced disruptions to include other phenomena such as widespread natural disasters and global medical emergencies. This event, along with the rising tensions flowing from "great power" competition, have highlighted the necessity for a robust defense industrial base that possesses the capability to surge and ensure enhanced lethality and continued dominance on the global stage (DOD, 2018). To reduce growing supply chain vulnerabilities, many policy-makers, academics, and researchers have suggested reshoring critical manufacturing processes into the domestic marketplace.

C. RESHORING

While the literature on reshoring and onshoring is extensive, we seek to provide a brief overview of these concepts and explain an application of reshoring to the domestic working dog industry. These concepts are often used interchangeably; however, there exists a difference between the two. Reshoring is the process of sourcing or bringing a business's production and operations back within the firm's domestic borders, whereas onshoring is the process of transferring production (that was never there before) within the firm's domestic borders (Ross, 2020). Although the United States has relied heavily on the supply of working dogs originating from European suppliers since the 1980s, the United

States possessed and still possesses the domestic capability to produce high quality working dogs (Beck et al., 2019; *Innovations in Security*, 2017).

The advantages of reshoring were highlighted in the study of American manufacturers such as Walmart and Wham-O-Toys. Some of the identified benefits of reshoring were shorter lead times, lower logistics and coordination costs, better quality control, improved intellectual property protection, and higher internal capacity utilization during an economic downturn (Bals et al., 2016). Additionally, the research stated that some of the manufacturers' primary drivers in bringing their operations back to the United States were long lead times, low responsiveness, high capital lockup, cultural problems, geographic distance, and intellectual property risks (Bals et al., 2016).

Since 1984, the U.S. government has relied on the "European solution," as described by Frost (1990), when procuring canines to support its missions. We see the potential to source more working dogs domestically as a reshoring strategy. However, it would be unrealistic to expect that reshoring alone can restore domestic production and limit the importation of working dogs that have been offshored since the 1980s (De Backer et al., 2016). An article from the *Harvard Business Review* regarding the erosion of the commons may explain this phenomenon. According to the authors, "When a major player in an industry outsources an activity, cuts funding for long-term research, and gains a short-term cost advantage, competitive pressure often forces rivals to follow suit" (Pisano & Shih, 2009, para. 23). They added that this decision could eventually force rivals to move critical mass of work, skills, and knowledge away from that major player (Pisano & Shih, 2009). This can be seen in the loss of a domestic capability to produce sufficient quality working dogs over the last several decades to meet government requirements.

While the concepts of the defense industrial base and reshoring are centered in manufacturing and production functions, the risk-reduction methodology associated with these concepts is applicable to working dogs. The federal government has utilized the principles of strategic sourcing and category management to address supply chain risks, improve efficiency and effectiveness, and drive greater value for the taxpayer (Office of Management and Budget [OMB], 2019). We now look to a review of category management

and its associated business intelligence tools, which can be applied to address the issues within the working dog industry.

D. CATEGORY MANAGEMENT

Category management is a procurement approach utilized by the federal government to buy smarter and mimic commercial enterprises' business practices (Defense Pricing and Contracting [DPC], n.d.). It is also the primary guiding methodology by which we address our research problem (see Chapter III for full details). According to the DPC,

> Category management enables the government to eliminate redundancies, increase efficiency, and deliver more value and savings from the government's acquisition programs. It involves identifying core areas of spend, developing heightened levels of expertise, leveraging shared best practices, and providing acquisition, supply, and demand management solutions. (para. 1)

Muir et al. (2014), who produced a concept of operations for the implementation of category management within the U.S. Air Force, defined *category management* as "the strategic management of spend categories using an array of tools to improve costs and achieve best-in-class category performance management of spend across an organization by category" (p. 21). They further defined *categories* as "sensibly-bounded pockets of requirement type where future spend is expected to occur" (Muir et al., 2014, p. 24).

According to Basuroy et al. (2001), in retailing, category management seeks to identify "interrelatedness of products within a category" (p. 16). The focus is towards the performance of the whole category instead of the individual brands within that category (Basuroy et al., 2001). Category management is broadly used throughout domestic and international industry by establishing categories of spend centered around commonly purchased goods and services such as IT hardware, health care services, financial services, or research and development (OMB, 2014, p. 2). The application of category management encompasses strategic sourcing but involves a broader set of techniques designed to drive performance and increase transparency in acquisition using improved data analysis while incorporating private sector best practices (OMB, 2014, p. 2).

Although category management is intended to provide acquisition, supply, and demand management solutions (DPC, n.d.), implementing it provides many challenges. The main challenges that procurement leaders face during implementation are communication between stakeholders and employment of sound acquisition processes (Category Management Magazine, 2017). Lisa Roberts, deputy assistant director of defense transportation policy, stated that the biggest challenge to the federal sector is ensuring that all agencies acquiring the same services are inclusive and transparent with each other. She added, "On the supplier partnership side, the biggest challenge is keeping the various industry sectors informed of what we are doing, why we are doing it, and what benefits they will see from category management" (Category Management Magazine, 2017, p. 29).

After reviewing the concept of category management at large, we now review its recent utilization within the DOD to better understand its application to the defense sector.

E. CATEGORY MANAGEMENT UTILIZATION IN THE DEFENSE SECTOR

Category management was introduced to the federal government at large in December 2014. Anne E. Rung authored the OMB memorandum *Transforming the Marketplace: Simplifying Federal Procurement to Improve Performance, Drive Innovation, and Increase Savings*, which heralded the paradigm shift from strategic sourcing to category management (OMB, 2014). Rung described the need for change to occur across the landscape of federal procurement by stating, "There is a critical need for a new paradigm for purchasing that moves from managing purchases and price individually across thousands of procurement units to managing entire categories of common spend and total cost through category management" (OMB, 2014, p. 2). With the aim to drive innovation, creativity, and improved performance through simplifying the federal contracting space, Rung described three pillars: buying as one through category management, growing talent within agencies to drive innovation, and building stronger vendor relationships (Air Force Installation and Mission Support Center [AFIMSC], 2017).

A government-wide category management guidance document was published in May 2015 and has been updated multiple times (Coalition for Government Performance, 2015). It provides governance, management, and operations guidance intended to address category management at the federal level versus department or agency level. In particular, the document outlines the overarching governance structure to be implemented to create a manageable and sustainable framework for category management. The governance structure is shown in Figure 1.

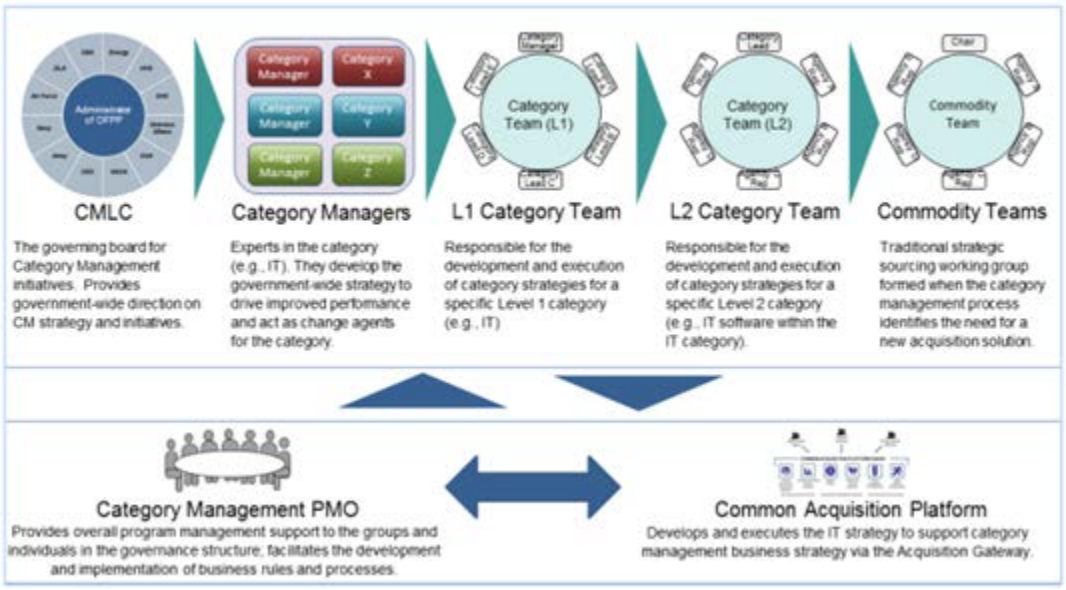

Figure 1. Category Management Governance Structure. Source: Coalition for Government Performance (2015).

The Air Force uses category management as a key component to shift from budget execution to performance of strategic cost management (Cooke & Laurent, 2019). To make data-driven decisions, the Air Force conducts rigorous market intelligence with the goal of cutting costs and improving capability and compliance (Cooke & Laurent, 2019). Additionally, each category utilizing a government-wide strategy is led by a senior government executive who is a subject matter expert in that category to drive and measure improved performance (OMB, 2014). By implementing category management methods, the products turn into informative, detailed, and well-established category intelligence

reports with concise recommended courses of action and practical execution plans (Cooke & Laurent, 2019).

During a visit to the AFIMSC at Joint Base San Antonio–Lackland on April 23, 2018, Deputy Under Secretary for Management and Deputy Chief Management Officer Rich Lombardi said that the aim of category management is to identify efficiencies in the Air Force's major commodities and services contracts (Aragon, 2018). Lombardi responded to the publishing of the national defense strategy by stating, "We have a clear understanding of where the department is going and category management clearly is a good fit with the line of effort to reform the department" (Aragon, 2018, para. 3). Lombardi added that this opportunity provides the potential of realigning the Air Force's resources to increase the readiness and lethality of the joint force (Aragon, 2018).

On March 20, 2019, Margaret Weichert, the deputy director for management at the OMB, distributed a memorandum titled *Category Management: Making Smarter Use of Common Contract Solutions and Practices* (OMB, 2019). This memorandum provided additional guidance on the use of category management within the federal government and placed requirements on agencies to complete and report on a set of management actions designed to bring common spending under management. The OMB directed agencies to plan to reduce unaligned spend, develop vendor management strategies, implement demand management, standardize requirements, share data, and train and develop the workforce (Defense Acquisition University, 2020).

In January 2020, Secretary of Defense Mark T. Esper released a memorandum to the DOD titled *Department of Defense Reform Focus in 2020*, which reiterates the strategic imperative to free up time, money, and manpower to "modernize the Joint Force and improve readiness and lethality" (Office of the Secretary of Defense [OSD], 2020, p. 1). He further explained that only a mindset shift in which leaders think critically about the optimal application of every dollar would accomplish the implementation of the National Defense Strategy (OSD, 2020). We can see that, over time, the continual push towards greater expectations for efficiency and effectiveness within federal procurement has not slackened or waned. Market intelligence, along with its associated business intelligence

tools, are a large part of understanding demand, spend, and contract performance management within a category management governance structure.

Next, we explore how the Air Force implements category management through market intelligence, business intelligence, and spend analysis.

F. MARKET INTELLIGENCE

Market intelligence is the utilization of existing data to study an organization's competition, market, customer and supplier behaviors, and political impacts ("Understand the Difference," 2018). It involves consideration of external market factors that may affect customers' current as well as future needs and preferences (Hawkins et al., 2012). Market intelligence is a broader and more rigorous approach to market research (Muir et al., 2014).

Market research is a critical means of providing expertise to the acquisition team and conducting an effective acquisition (DPC, n.d.). In Muir et al.'s (2014) concept of operations, they described the Air Force's approach to market research by stating, "In practice, the Air Force utilizes a supply base analysis to accomplish market research for most of its tactical, installation-support requirements" (p. 27). This process may involve administering surveys, making phone calls, and conducting interviews ("Understand the Difference," 2018) to gather supply base data that can be transformed into useful information used to understand market composition, supplier capabilities, and best-in-class approaches to better develop requirements (Muir et al., 2014).

Although there is a wealth of knowledge that can be obtained through market intelligence, this tool comes with some restrictions and limitations. For example, Desai (2002) noted that one criticism of qualitative market research is that some interviewees do not necessarily answer interview questions to relate their actual performance but provide responses that create a perception that their performance was in line with expectations (p. 3). However, Seale (1998) suggested that interview data can still be used as a resource for analysis, as they reveal an interviewee's feelings, attitudes, and motivations and how the subject constructs themselves outside the interview context. While market intelligence has many useful benefits, it is typically best used in combination with business intelligence. The key difference between the two concepts is that business intelligence is knowing what

the organization is doing, whereas market intelligence is keeping track of what the market is doing (Moorhead, 2019).

G. BUSINESS INTELLIGENCE

Business intelligence is a method that organizations can use to convert operational and performance information such as sales data, new customers, costs, and time lines into metrics that they will use to improve their operational outcomes (Moorhead, 2019). The AFICC is in a key position to shape enterprise-wide spend through the application of business intelligence tools (Muir et al., 2014). The AFICC, formerly known as the Air Force Installation Contracting Agency (AFICA), is located at Wright–Patterson AFB, OH, and serves as a primary subordinate unit to the AFIMSC located at Joint Base San Antonio, TX. The AFICC is responsible for managing and executing acquisition solutions across the Air Force enterprise that are beyond wing-level operations (Wright–Patterson Air Force Base [WPAFB], n.d.). The AFICC was designed to serve multiple roles by providing the Air Force with contracting oversight, specialized execution, and strategic sourcing capabilities (U.S. Air Force, 2013).

To better manage organizational spend for the Air Force, the AFICC uses practices and principles from category management and common business sector techniques such as spend analysis and in-depth market intelligence activities, which can help the Air Force retain its competitive advantage by structuring, leveraging, and bundling the resources it possesses (Holliger, 2018). We look to the AFICC to inform our methodology in this study of GWDs, as it actively utilizes category management principles and tools within the defense sector to inform, detail, report, and formulate recommendations that are both actionable and practical (Cooke & Laurent, 2019).

We now discuss one of the primary tools available for market intelligence.

H. SPEND ANALYSIS

Spend analysis is a systematic process of analyzing historical expenditure data that allows for holistic, detailed spend visibility and control (Pandit & Marmanis, 2008). Muir et al. (2014) stated, “Spend analysis leverages data science and domain knowledge to

generate actionable information for improving buying power and cost performance" (p. 27). According to the *Government-Wide Category Management Guidance*, these data are used to understand the current performance, opportunities, and trends and to establish baselines for the categories and sourcing strategies as well as measurement category performance (Coalition for Government Performance, 2015).

In 2004, the Research and Development (RAND) Corporation was asked by the Air Force deputy assistant secretary for contracting to conduct spend analysis on the Air Force's expenditures and its supply base with the primary goal of identifying opportunities in purchasing and supply management (Dixon et al., 2005). Although the report stated that there were limitations based on the scope and quality of the available data, it also identified some potential areas of savings for the Air Force (Moore et al., 2004). Other than pointing out that the Air Force needs improvements in the quality and number of sources of available data, RAND also recommended consolidating the Air Force's purchase office codes and local base operating support services to reduce transaction costs and improve efficiencies across bases (Okamoto, 2018).

Many commercial firms have already proven the benefits of spend analysis in improving their product support management initiatives (Moore et al., 2004). It is high on most procurement organizations' priority lists (Muir et al., 2014), as it aims to help leaders increase the visibility of their spending, encourage more insightful sourcing decisions, and ascertain all possible cost-saving opportunities (Limberakis, 2012). However, several limitations must be considered to ensure that the benefits of spend analysis can be achieved. Pandit and Marmanis (2008) listed some of the limitations, such as when raw transactional data are not cleansed or enriched in any way, scope creep results in performance issues, and more importantly, knowledge and assimilation of that knowledge are not designed into the system.

I. CONCLUSION

Despite the widespread importance of working dogs to national security and the wealth of research conducted on working dog health and wellness, there is a dearth of scholarly research written to address the supply constraints that exist within the domestic

market for this critical asset. In this chapter, we addressed and reviewed research related to the procurement of working dogs, the defense industrial base, and the concept of reshoring. We also gave an overview of category management and some of the business intelligence tools it offers. Using category management as a context through which to address the issues affecting the domestic production of working dogs, we now address the methodology employed in this research project.

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III. METHODOLOGY

In this chapter, we seek to detail the data collection, spend analysis, interview protocols, and synthesis of the data into usable outputs. Due to the lack of scholarly research directly focused on our research question, this research was conducted as an exploratory applied study that utilized a mixed methods approach. The four primary research tasks are described as follows.

A. DATA COLLECTION

We gathered all available data related to working dogs from internal government sources. Our primary source documentation was a draft version of the *Government-Wide Category Intelligence Report (CIR) for 3.1 Security Animals (Working Dogs)* (FCM, 2019), which gave insight into the government's perspective on the working dog marketplace. This draft report detailed an initial attempt at conducting a requirements analysis and market analysis, along with a gap and recommendation analysis of the working dog category in federal procurement.

The AFICC distributed a request for information (RFI) in November 2019 through *FedBizOps.gov* (now incorporated into SAM.gov), the government's online point of entry for soliciting business with civilian contractors. This RFI gathered data from respondents on a wide range of questions related to contractors' business practices, motivations, and issues with federal procurement practices related to working dogs.

B. SPEND ANALYSIS

To understand the current state of the federal governments' expenditures on canines, we conducted spend analysis using the data collected from the Federal Procurement Data System–Next Generation (FPDS–NG). We investigated four federal departments in this analysis: the DOD, the DoJ, the DoS, and the DHS. We used the Product and Service Code (PSC) 8820, *Live Animals, Not Raised for Food*, as the focus of our search. This PSC code captured contract actions related to working dog procurement during Fiscal Years (FY) 2014, 2015, 2016, 2017, 2018, and 2019.

To ensure that we analyzed only unique contract actions that were relevant to our research, we filtered the data set. We removed entries that did not pertain to the purchase of live dogs from the data set. We also removed all contract actions that were not the initial contract or delivery order. Using the FPDS–NG Data Element Dictionary, we isolated the data points that might have provided insight on how the government procures canines. We created a new data table containing Agency Identifier, Date Signed, Current Completion Date, Action Obligation, Contracting Agency Code, Program/Funding Code, Type of Contract, Description of Requirement, Zip Code Place of Performance, Place of Manufacture, Number of Offers Received, Award Type, Vendor Zip Code, and Small Business Status. Using Tableau, a data visualization tool, we conducted an in-depth data analysis to identify patterns and create visualizations describing how the four departments in this study procure canines.

C. IN-DEPTH INTERVIEW

To gain further insight on the status of the canine industry, we conducted interviews with individuals who possess comprehensive knowledge and experience in the domestic working dog market. We selected these experts by using the data collected and the literature reviewed to conduct an initial stakeholder analysis. We invited individuals from different sectors of the canine industry to participate in the interview process. Among the sectors represented in this research are a nationally recognized canine organization, firms that are currently doing business with the government, firms that are no longer doing business with the government, firms that have not done business with the government, firms that have no interest in doing business with the government, academic institutions, and representatives from a government breeding program.

1. Questionnaire and Protocol

Using the available literature describing the factors affecting the domestic supply of working dogs, we developed a handout (see Appendix C, page 90) that we used as our protocol for conducting the interview. The handout described the objectives, background, and nature of our research. Additionally, it consisted of two primary questions:

1. What are the most important factors impacting the domestic production and supply of military working dogs?

2. What steps could stakeholders such as the U.S. government, industry associations, and breeders take to improve these factors?

Finally, the handout provided a summary of the results of our preliminary research to guide the discussion. To check the validity of our protocol and ensure that our questions did not meet the criteria for human subject research, we provided the Naval Postgraduate School Institutional Review Board (IRB) with a copy of the interview handout, and the IRB approved our determination request.

2. In-depth Interview Process

The research participants were contacted via email with a follow-up phone call to schedule the interview. The respondents were given 1 week to review the handout before the actual interview. The interviews were conducted via teleconference. To minimize the impact on the participants, each interview was scheduled for only 1 hour. For documentation purposes, we recorded the interviews after receiving permission from the participants. The recordings were transcribed, summarized, and utilized for our analysis. We consolidated the participants' key points and arranged the relevant information by primary topics and subtopics to identify patterns and themes within the responses.

D. INTERIM REPORT

Following these activities, we completed and delivered an interim report to the AFICC and the GWD category management team (CMT); the report summarized a brief history of working dogs' use within the armed forces and the results of our initial research and suggested courses of action for the GWD CMT to pursue. Our research occurred concurrently with the GWD CMT's efforts to address challenges with working dog procurement. The interim report acted as a means of information exchange between our teams and a mechanism for validation of our initial findings with the government's working dog procurement experts. The report, as well as our initial research, focused on the DOD's use of military working dogs and the factors that influence domestic production.

E. DATA SYNTHESIS

To synthesize the data gathered throughout the research process, the findings from the research gathered from government sources, the spend analysis, and the interviews, we conducted a formulation workshop. We invited experts in the supply chain and marketing disciplines to attend the workshop.

A process map was developed to provide greater understanding of the stakeholders involved both internally to the government and externally within the supply base for working dogs. Using the initial stakeholder analysis and the process maps as our baseline, we conducted a focused analysis of the supply side of the procurement life cycle. We also analyzed the mechanisms prevalent in the supplier base. These activities led to the creation of an attribute map of the supply base and a formal market segmentation.

We used the results of this analysis to characterize features of suppliers against their willingness to do business with the DOD or other federal departments. We then derived proposed dimensions to represent a segmentation of suppliers within the marketplace. The defining features of suppliers were then categorized by the proposed dimension they represented within the market segmentation.

F. MARKET SEGMENTATION

Using the data from the RFI provided by the GWD team as well as the attributes and characteristics identified in the workshop, we developed a market segmentation model. We filtered and reduced the RFI data to contain only responses to questions regarding System for Award Management (SAM) registration, breeding and reselling capacities, means to forecast demand, predominant customers, previous work with the government, and annual revenue. These data points were converted into scores (see Appendix E, page 118), and each vendor from the available data set was assigned coordinates based on their scores and was plotted into the market segmentation model.

G. MARKETING PLAN

Through the aggregation of the data gathered and all activities completed, we developed a marketing plan with the intent of encouraging participation in the domestic

working dog market. This plan details the internal and external stakeholders and the marketing segmentation devised previously—along with the application of the model, a proposed GWD marketing team structure, and suggested marketing activities to support the objectives of the plan.

H. SUMMARY

This chapter has detailed the primary research tasks performed as well as a summary of the outputs of the research. This exploratory applied study has sought to understand and articulate the factors affecting the domestic supply of working dogs. The results of the implementation of this method are discussed in Chapter IV.

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IV. RESULTS AND DISCUSSION

This chapter shows the results of applying the methodology described in Chapter III to understand and articulate the factors affecting the domestic supply of working dogs. Our initial assumption based on the data contained within the CIR, as well as our research into the available literature, was that there exists a shortage of domestically bred working dogs available to meet the government's demand. Our research conducted through targeted spend analysis, in-depth interviews, and a robust expert workshop revealed that there are a host of influencing factors that affect the domestic supply. As we conducted our methodology, we uncovered factors that act as barriers and restrict domestic producers from supplying working dogs to the government, resulting in a perceived inventory shortage. These include economic and cultural factors, issues with the government procurement system and execution, and problems with government-to-business (G2B) communication.

We supplied the information gathered to the AFICC, the sponsor of our research, along with our recommendations and suggested courses of action. The AFICC is actively seeking to address the economic, cultural, and procurement system factors that impact domestic production of working dogs, and we are pursuing solutions that address the G2B communication issues that were uncovered during our research.

A. SPEND ANALYSIS

In their effort to inform the CIR, the GWD team conducted spend analysis and market intelligence on the working dog industry. The scope of their analysis included canines along with all necessary supplies and services such as kennels, food, and training needed for working dog programs. Although the GWD team's analysis provided us with great perspective and a strategic point of view regarding the overall scale of this category, it was missing some granular details that we needed in order to answer our research questions.

To supplement and enrich the output of the CIR, we narrowed the focus of our spend analysis to only contract actions for the purchase of working dogs and eliminated actions for all other related items such as construction of kennels and the purchase of food or other necessary equipment. We conducted a focused search in FPDS–NG to gather a robust set of data to explore any correlations or differences between agencies' spending. The PSC 8820 (Live Animals, Not Raised for Food) is the standard PSC code used to track working dog–related purchases. The result of our query using PSC 8820 showed that the government has 2,637 entries in FPDS–NG during FY2014, FY2015, FY2016, FY2017, FY2018, and FY2019 originating from the four federal departments (DOD, DoS, DoJ, and DHS) that are the primary buyers of working dogs. During our analysis, we discovered that the data contains nonunique records. From the search results, we eliminated entries for base indefinite delivery vehicle contracts, including the base blanket purchase agreements (BPAs), base indefinite delivery–indefinite quantity (IDIQ) contracts, and all modifications to the base contracts, BPA calls, and delivery orders that can create multiplicative entries. Additionally, after reviewing the descriptions of the contract actions, we learned that not all of the entries are directly linked to the procurement of working dogs. We removed these entries and retained only transactions that are clearly indicative of purchasing canines. Out of the 2,637 entries, only 533 were considered unique contract actions for the purchase of working dogs. Each entry in FPDS–NG contains numerous data elements, not all of which are applicable to our research. We analyzed seven data elements from the 533 entries to include agency identifier, effective date, type of contract, number of offers received, vendor zip code, obligation amount, and small business status. The other data elements, which relate to items such as contract award number, small business subgroup, statutory exceptions, performance-based service contracts, and contract financing, were not considered within our analysis because they are irrelevant to drawing implications on overall spending trends. Last, using Tableau, we conducted an in-depth data analysis and constructed visualizations to show the patterns that we identified in describing the similarities or differences on how each of the four departments listed above are procuring canines.

As we demonstrated in Chapter I, the DOD has historically had a great influence on the domestic working dog marketplace. Since the AFICC represents the DOD's working dog program through the government working dog category manager and is the sponsor of this research, special emphasis has been placed on DOD spending within our analysis. As the spending by the DoJ and the DoS is comparatively miniscule compared to that of the DHS and the DOD, there were instances where our analysis primarily focused on comparing DOD spend with DHS spend. A more detailed comparison of the spend analysis is contained in the Spend Analysis Data and Visualizations (see Appendix A).

One of the major limitations of our data set was that it is only comprised of transactions reported to FPDS–NG. While FPDS–NG is the government's authoritative data source for contract data, it may not contain all transactions related to our research. There are programs and contract vehicles such as transactions utilizing government purchase cards and non-appropriated funds that are exempt from FPDS–NG reporting. Additionally, the completeness of our data depends on the correctness and accuracy of the assignment of procurement codes by contracting officials within the federal government.

While reviewing the data collected, it became apparent that the DOD spending data contained only two entries in 2019, which dramatically skews the overall data in that year and limits the conclusions that can be drawn across the 6 years of the data set.

After filtering the data, we begin by reviewing the yearly spend by department.

1. Yearly Spend by Department

A visual representation of the yearly spend data by department is shown in Table 1.

Table 1. DHS and DOD Working Dog Spending by Fiscal Year

Department		FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
DHS	Minimum	$ 16,728.00	$ 58,140.00	$ 5,000.00	$ 17,061.00	$ 6,900.00	$ 9,000.00
	Average	$ 273,622.29	$ 446,950.19	$ 308,183.47	$ 138,106.96	$ 126,437.24	$ 166,791.00
	Maximum	$ 587,642.40	$ 1,442,092.07	$ 1,581,844.55	$ 389,675.00	$ 331,100.00	$ 342,000.00
	Total	$ 1,915,356.00	$ 3,575,601.50	$ 6,163,669.47	$ 3,728,888.00	$ 3,666,680.00	$ 4,169,775.00
	Vendor Count	7	8	20	27	29	25
	Percent of Avg spending per vendor	14%	13%	5%	4%	3%	4%
DoD	Minimum	$ 19,660.00	$ 6,600.00	$ 81,000.00	$ 28,000.00	$ 6,750.00	$ 29,355.00
	Average	$ 231,480.04	$ 72,386.53	$ 261,668.75	$ 167,882.00	$ 251,464.68	$ 32,077.50
	Maximum	$ 645,497.12	$ 264,800.00	$ 552,562.52	$ 505,950.00	$ 1,084,050.00	$ 34,800.00
	Total	$ 694,440.12	$ 434,319.16	$ 1,570,012.52	$ 2,518,230.00	$ 5,029,293.50	$ 64,155.00
	Vendor Count	3	6	6	15	20	2
	Percent of Avg spending per vendor	33%	17%	17%	7%	5%	50%

Based on the spend data collected, the government has spent a total of $38.9 million over the course of 6 FYs, with 533 contract actions for the procurement of working dogs. The results show that the majority of these purchases were conducted by the DHS, which spent $23.2 million with 269 contract actions, and the DOD, which spent $10.3 million with 143 contract actions. The DoS and the DoJ spent a total of $4.5 million with 38 contract actions and $83,000 with 83 contract actions, respectively. With the exception of the spike in procurement of working dogs in FY2016, and disregarding the incomplete data for FY2019, we can infer from the available data that there has been a steady increase in the demand for canines within the federal government since 2014 (see Figure 2). Amounts are based on FPDS data after filtering and may not include all transactions. This applies to all spend analysis data in this chapter and in Appendix A.

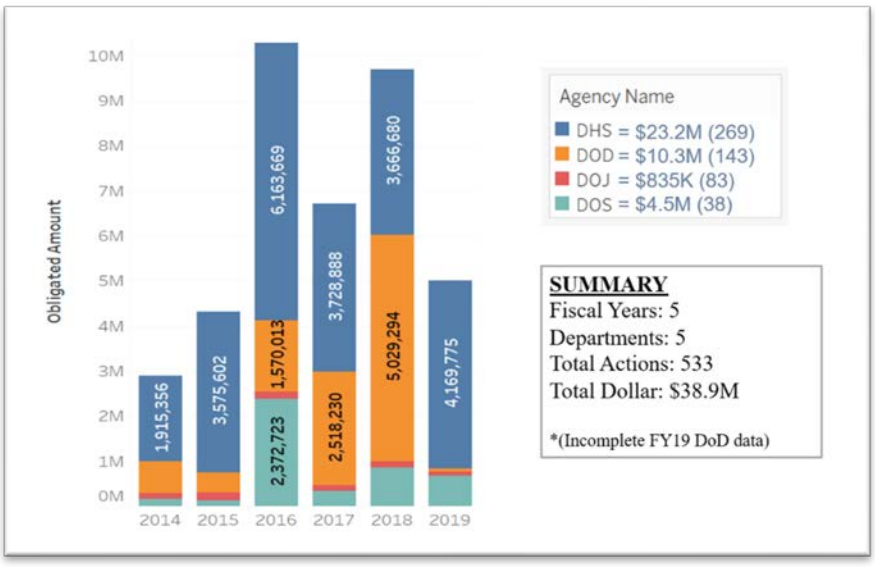

Figure 2. Contract Spend on Government Working Dogs, by Agency and Year

2. Vendor Location

Next, we look at the locations of vendors that are currently doing, or have previously done, business with the government. The data represented are the aggregation of all 6 years of spend data in the data set. There were 81 different vendors captured in the spend analysis data set. These vendors are located across 28 states, as shown in Figure 3. The states are labeled with the number of working dog vendors and are colored based on the density or concentration of vendors in that state. The darker shaded states indicate a higher concentration of vendors. Figure 3 displays the concentration of vendors on a color scale from light blue, as the least concentrated, through dark blue, as the most concentrated. Based on the visualization, there is a significant concentration of vendors located in Texas and along the southeastern coastline of the United States.

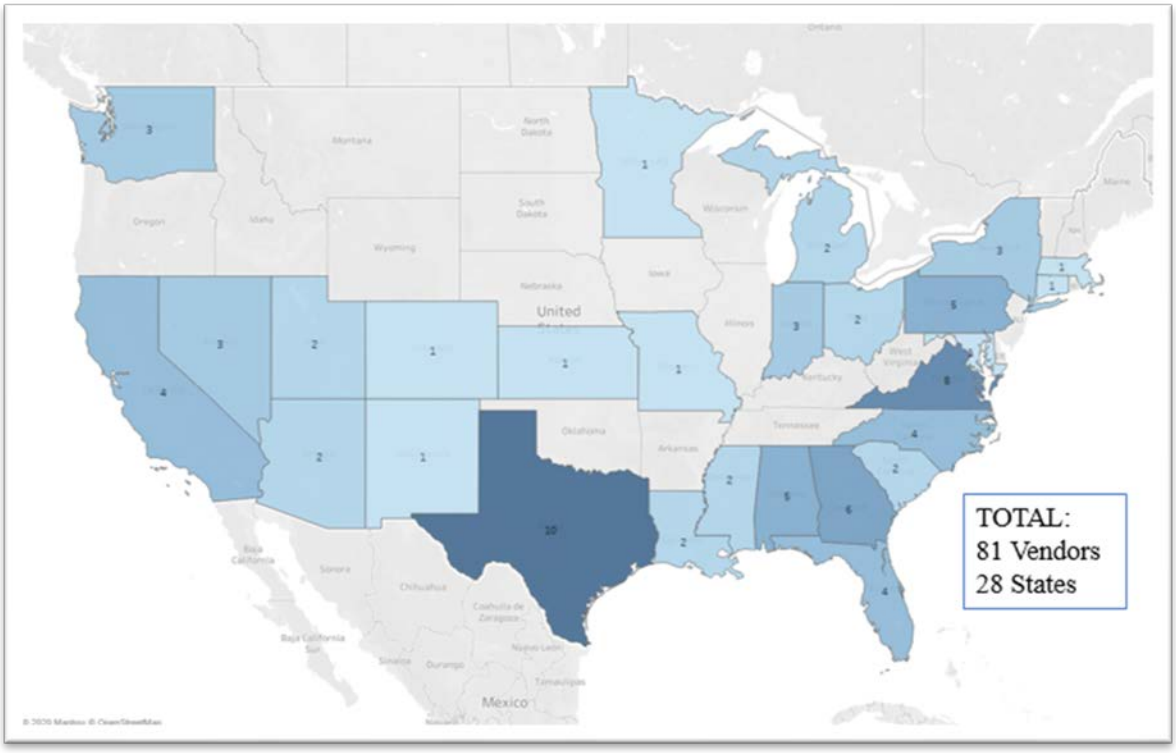

Figure 3. Vendors by Location

The quad chart in Figure 4 has the vendor locations broken down by department to provide a comparative visualization of the relative location of vendors doing business with each department. Based on the data, the DHS has the most diverse spread of vendors, which is larger than the vendor base of all other departments combined. The DHS conducts business with 66 vendors across 26 states, which can be attributed to multiple agencies within the department—such as Customs and Border Patrol, Coast Guard, and Immigration and Customs Enforcement—that are in charge of working dog procurement. The DOD, on the other hand, conducts business with 25 vendors across 16 states. Given that the only selection site for the DOD's working dog procurement is located at Lackland AFB in San Antonio, TX, it is not unexpected to see a concentration of the vendor base in Texas and neighboring states in the southeastern region.

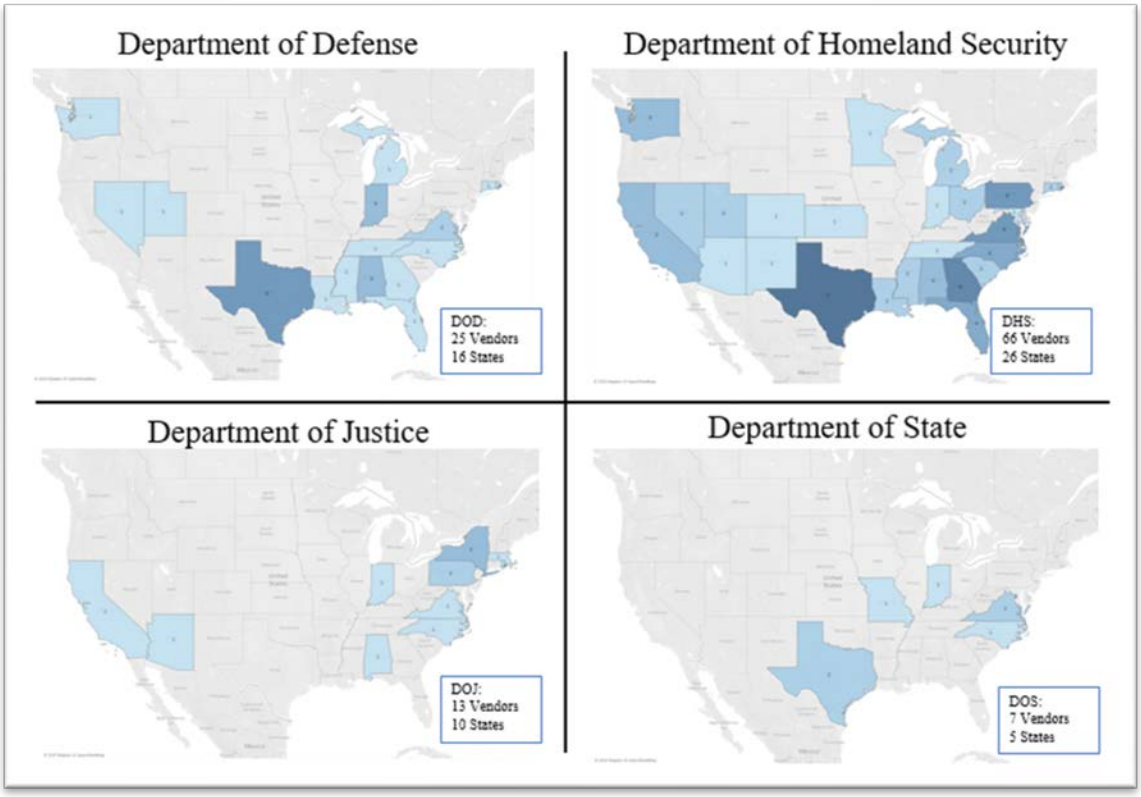

Figure 4. Vendor by Location by Department

3. Vendor Base

When reviewing the visualization showing the dollars spent by departments with individual contractors, it became clear that a disparity existed between the DHS and the DOD (see Appendix A to review the data and associated visualizations). When reviewing the aggregate obligations per vendor, a clear conclusion can be drawn. Simply put, the DOD is spending more money with fewer vendors than DHS. Taking the previously mentioned issues with the DOD FY2019 spend data into account, a pattern can be seen in FY2017 and FY2018, where the DOD has concentrated its spending across a smaller vendor base and has on average spent more per vendor than DHS.

As shown in Table 1, the DHS and DOD obligations are concentrated on a limited number of vendors in FY2014 and FY2015. After a record-breaking year in screening activities and criminal arrests by the Transportation Service Administration, Customs and Border Patrol, and the Coast Guard, a significant increase in DHS spending on working

dogs was observed in FY2016 (Department of Homeland Security, 2016). Our analysis indicates that there is a proportional increase in new vendors utilized by DHS in the same year as well. A change then occurs as spending is dispersed and leveled across the vendor base throughout FY2017–FY2019. The DOD, however, maintained a small and concentrated vendor base throughout FY2014–FY2017, with gradual spending increases across the vendor base and some aggregation of spending with a handful of vendors. Between FY2017 and FY2018, there was a noticeable spike in DOD spending. Based on insight from a retired government official familiar with the DOD MWD program, the sudden increase in spending was caused by the award of 21 additional BPAs to help stimulate the domestic working dog marketplace. Additionally, a programmatic shift easing the capability requirements for canines being submitted for evaluation increased the pool of acceptable candidates available for purchase.

With a general understanding of the current vendor base (i.e., those doing business with and those who have recently done business with the government), we turn our analysis to focus on a narrower scope. As the AFICC is keenly interested in small business participation, we proceeded with the analysis of each department's utilization of small businesses.

4. Small Business Utilization

As part of our research, we highlighted the differences on how each department utilizes small businesses to fulfill their working dog requirements (see Figure 5). Although all of the departments are exceeding their small business goals, it is apparent that the DHS is leading in the effort to shift its spending profile to focus more on small business firms. The DHS allocated a total of $22.4 million (96%) of its total obligations on canines to small business firms. The lower average amount of spending per vendor by DHS indicates that they were most likely concentrating their spending on small businesses, which would have smaller inventories of qualified working dogs available for evaluation and purchase. The next highest small business utilization is the DoS, which spent a total of $3.3 million (73%) of its total obligations on canines to small business firms. This is followed by the DoJ, which spent a total of $301,000 (30%) of its total obligations on canines with small

business firms. Last, while the DOD awarded a total of $2.7 million to small business firms, it was only 26% of its total obligations on working dogs.

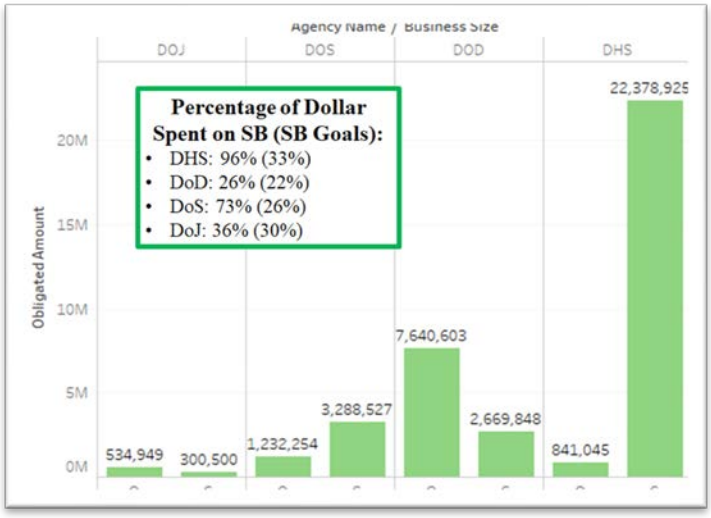

Figure 5. Small Business Utilization by Department

This spend analysis shows that there is not a unified approach to working dog procurement throughout the federal government. Each of the major departments outlined in the spend analysis vary widely in yearly spending level, vendor geographic concentration, vendor base consolidation, and small business utilization. Considering all of these differences, a single GWD spend strategy may not be readily implemented or even feasible. It may be necessary to apply a tailored approach to managing this category. Regarding this research, one of the major limitations of the spend analysis performed is that it only captured the vendors that have done business or are currently doing business with the government. To get at the larger market outside of our spend data, we turned to additional market research methods.

B. IMPLICATIONS OF THE REQUEST FOR INFORMATION

As we concluded our spend analysis, we received the result of the RFI that was distributed by the AFICC in November 2019 through *FedBizOps.gov* (now incorporated into SAM.gov), the government's online point of entry for soliciting business with civilian

contractors. Out of 139 unique global suppliers of canines that were identified by the AFICC in their initial market research (FCM, 2020), only 41 responded to the RFI. After reviewing the result of the RFI, we discovered that only 29 of the respondents have had experience doing business with the government in some capacity, while the other 13 have not done business with the government at all. Based on the data evaluated from the RFI along with our other research, it is clear that a shadow market exists, and there are challenges and constraints preventing these entities from engaging in the government sector of the working dog market.

Cory Mitchell, a professional day trader, defined *shadow markets* as companies, including those in an unregulated private market, that can be purchased from, despite those firms not being publicly traded (Mitchell, 2019, para. 1). James Chen, a content director covering trading and investment, provided an example of shadow markets from the real estate industry by describing inventory that is not yet available (Chen, 2020, para. 1). He stated that,

> Shadow inventory refers to uninhabited or soon-to-be-unininhabited [*sic*] real estate that has yet to be put on the market. It is most often used to account for those properties that are in the process of foreclosure but that have not yet been sold. It also encompasses homes that owners are waiting to put up for sale until prices improve" (para. 1).

For the purpose of our research, we define the term *shadow market* or *shadow inventory* as being composed of those working dog vendors operating outside of the government's working dog supply base or that the government is unaware of that could eventually become part of the active supply base. To better understand the behaviors of the suppliers in the domestic marketplace, including those within the shadow market, we turned to subject matter experts, prominent organizations, and established businesses in the canine industry.

C. IN-DEPTH INTERVIEWS

To gain a deeper understanding of the working dog market and to gain insights into the shadow market that exists outside of government procurement channels, we conducted in-depth interviews with six subject matter experts. Note that our ability to conduct

numerous in-depth interviews with nongovernmental personnel is limited by the Paperwork Reduction Act (1995), which regulates the number and type of interviews allowed by government personnel conducting research for academic purposes. We interviewed individuals belonging to organizations ranging from a nationally recognized canine association, businesses that are currently doing business or that have done extensive business with the government, former and current government employees involved in working dog programs, and subject matter experts and representatives of renowned academic research institutions.

Although the interview handout guided the conversations, we kept the flow of information unstructured to improve the richness of the data. The majority of discussion centered around interviewees' verbal responses to Big Question #1: What are the most important factors impacting the domestic production and supply of military working dogs? After a discussion of the factors, the interviews shifted to addressing Big Question #2: What steps could stakeholders such as the U.S. government, industry associations, and breeders take to improve these factors? A consolidation of the key points of information gained from the participants in relation to the research questions was arranged by primary topic and subtopics (see Appendix B). Furthermore, a detailed description of the factors and areas of improvement are contained within the interim report (see Appendix C), which was submitted to the AFICC.

Next, we discuss two of the factors affecting the domestic supply and production of working dogs that guided our research to our primary recommendation.

1. Factor 1: Economics of Importation

Despite the difference in the interviewees' expertise and backgrounds, there is a strong consensus regarding the economic advantages of importing canines compared to breeding them domestically. According to several industry experts, domestic vendors are more likely to import working dog candidates than breed them domestically due to the lower average total cost of an imported dog. One vendor remarked that, "It's strategically a numbers game." Domestic breeders will not participate in the market when they are unable to produce and sell enough dogs to afford to maintain their kennels and earn a living

wage for their efforts. A breeder who was interviewed stated that the primary factor that differentiates the European market from the domestic market is that "the cost of labor in the United States is very expensive." In addition to the labor involved in raising and training a dog, breeders incur higher costs in maintaining facilities, food, and medication, which contributes to the final selling price of the canine. These additional costs make the vendors' profit margin lower than those of the importers. One of the vendors claimed that their company will never breed dogs to sell. He stated, "You know what those dogs would cost if you raise the amount that you needed from a puppy up until the [*sic*] fruition? It would be astronomical!" These high costs in the domestic marketplace encourage suppliers to shift their business models from a "full-service" operation that covers the entire working dog life—including breeding, training, and reselling—to rely primarily on imported canines and specialize as trainers and resellers, or solely focus on importation to increase profitability.

To understand this information, we drew the process map that illustrates the phases of a dog's growth combined with the stages of the procurement life cycle of working dogs. While the process map shown on Figure 6 is not all inclusive, it represents a general understanding of the major milestones in the government acquisition of working dogs. The development of the phases and the diagrams are explained in more detail in the interim report (see Appendix C).

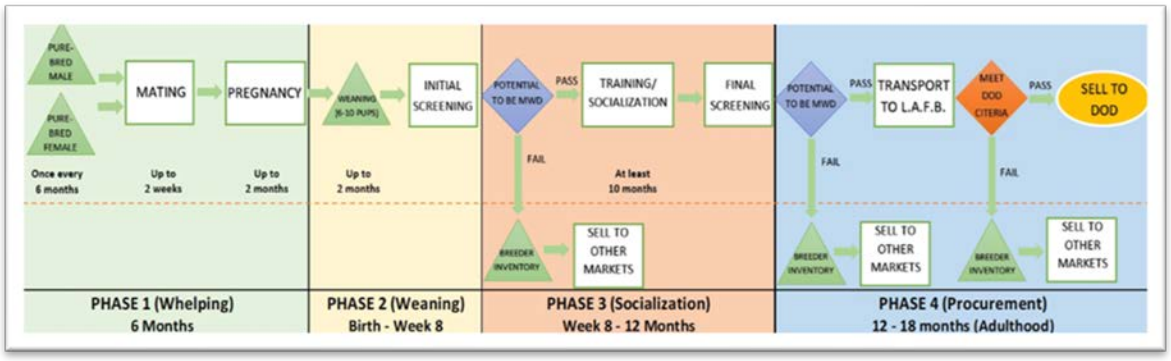

Figure 6. Process Map of Working Dog Procurement

2. Factor 2: Challenges of Doing Business With the Government

The majority of the interviewees expressed that they continue to sell canines to the government in support of the national security missions to which working dogs are a critical pillar of support. However, despite their patriotic motivations, the onerous procurement process of the government discourages vendors from supplying canines to the government sector of the market. The nonstandard requirements, evaluation system, and—most importantly—the uncertainty of the government's future demand for working dogs makes it difficult for vendors to continue doing business with the government. One of the vendors commented, "This motivates an overly cautious perspective that keeps us from procuring dogs (to sell to the government)."

Another major area of concern that increases the challenge of doing business with the government is the communication between the government and the suppliers in the domestic marketplace. Without open and high-quality communication between the buyer and the seller, it is extremely difficult to provide quality products. According to one of the experts we interviewed, "historical issues with understanding expectations" is one of the barriers that breeders and vendors are facing when working with the government. One of the interviewees stated that the government is aware of these issues and unfortunately, these misunderstandings have resulted in adversarial relationships between the government and suppliers. The interviewees agreed that it would be useful if the government provided feedback to suppliers to increase their ability to meet requirements and to increase their confidence that suppliers are moving in the right direction to meet the government's needs. Additionally, a general lack of consistency in requirements for working dogs from department to department, as well as the differences in the procurement process between departments, has caused significant confusion for suppliers seeking to do business in the government sector. A vendor stated specifically that in regard to the procurement process and canine evaluation, "The tests are all different, depending on the needs of the agencies." In addition to the inherent difficulty of raising and training living creatures to meet a high standard of performance, the variability in testing requirements and the potential subjectivity of evaluation personnel increases the challenge of supplying to the government. Some vendors reported leaving the government market or choosing not to do

business with the government at all, in favor of local markets or direct sales due to the difficulties inherent in the procurement process and the lack of effective channels of communication.

As a result of our analysis of the in-depth interviews, we were able to identify the major factors that influence domestic working dog production such as the economics of importation and the challenges of doing business with the government. While our research captured numerous concerns facing stakeholders in the working dog industry, we were able to group these issues into categories representing major factors that influence the domestic supply of working dogs. Additionally, we used this information to propose a set of possible courses of action that could be taken to address or alleviate some of the issues facing the government. Among the courses of action listed in the interim report that we provided to the GWD CMT, the development of ways and means to improve government and industry communication was selected for additional exploration.

We now shift from the results of our data collection to the application of that data to generate actionable outcomes and recommendations.

D. FORMULATION WORKSHOP

Since the AFICC and the GWD team have started their efforts in resolving some of the issues that we have identified—such as the economic, cultural, and procurement system factors impacting domestic production—we held a formulation workshop to address the difficulties in G2B communications. One of the proposed courses of action that we provided to the GWD team to address the issues in G2B communication was to create and implement a small business communication plan. The intent of the formulation workshop was to draw on the experience of experts in the supply chain management and marketing fields to synthesize and apply the information, knowledge, and insight gained from our research into an executable and replicable communication plan to support the AFICC and the GWD teams' objectives.

First, we identified and differentiated the stakeholders within the procurement life cycle of working dogs, using a process map based on the Air Force's MWD procurement process as shown in Appendix C, Diagram 1. With our focus centered on exploring the

communication difficulties between government and industry, we turned our attention to the supply side of the industry within the stakeholder analysis to understand their motivations. This led us to explore what motivates or drives suppliers in the working dog industry to participate in the government sector.

1. Attributes and Drivers

To capture and articulate what motivates suppliers in the working dog industry, we created an attribute map (see Appendix D). The attribute map contained categories such as values (what is important to suppliers), motivators (what makes suppliers want to participate), exciters (what dramatically increases suppliers' willingness to participate), tolerables (what suppliers will live with or accept to participate), de-motivators (what reduces suppliers' willingness to participate), and killers (what destroys suppliers' motivation to participate). We filled out each category by linking the information we had gathered from our previous research. Based on the results of the attribute mapping exercise, we determined that there are certain areas of influence that impact suppliers' business decisions within the domestic working dog marketplace. These areas of influence are motivated by driving factors that can be correlated or "binned" into particular areas of influence that affect their desire to do business with the government. This information is displayed in Table 2.

Table 2. Areas of Influence and Drivers

	Areas of Influence	Drivers
1	Purpose (Tool/Family)	· Culture · Philosophical disagreement · Misinformation about MWD care/lifestyle · Patriotism · Government -> industry revolving door
2	Need for Certainty	· Return on Investment · Loyalty · Terms of commitment · Lack of forecasted demand
3	Production Capacity	· Funding · Price · Land & equipment · Time · Human Resources · Contract arrangement
4	Geography, Proximity, Distance	· Cost of transportation · Price · Buy American Act · Information network · Evaluation resources are limited · Impacts to dog selection rate (fatigue)
5	Dog Breed	· Pedigree & traits · Performance · Potential profit
6	Capability	· Costs to raise/train to maturity · Experience · Relationships

- **Purpose (Tool/Family):** The first area of influence that affects a domestic producer of working dogs is how they view or interpret the purpose of a working dog. Is the animal considered a tool or a part of the family? The drivers that affect this are the dog culture most prevalent to the producer; potential philosophical disagreement the producer may have with the intended use of the working dog; misinformation about the treatment, care, and lifestyle of working dogs; desire to support the nation by providing working dogs (i.e., patriotism); or the desire to utilize previous government work experience with working dogs in the private sector.

- **Need for Certainty:** The need for certainty is driven by the potential for a more guaranteed return on investment, loyalty to suppliers and customers,

contractual terms that reinforce continued business relationships, and hesitancy to do business and make investments when unable to forecast anticipated demand from customers.

- **Production Capacity:** Another area of influence is production capacity. The production capacity of a firm is driven by the amount of or access to sufficient funding to support business operations and available assets such as land or facilities to support working dog whelping, training, and sustainment. Additionally, the availability of time (i.e., schedule capacity) to support additional business above current operation and the extent of available personnel (HR capital) with sufficient experience to perform all required actions for raising and training working dogs drive this area of influence. Finally, the contract arrangement, or the contract vehicle that sets the terms and conditions, anticipated or in place between the vendor and customer can drive production capacity as the contract terms dictate items such as cash flow (invoicing processes, payment terms), inventory, and the application of available resources.

- **Geography, Proximity, Distance:** Given the dispersed nature of working dog breeders and vendors in the domestic market, geography, proximity, and distance influence domestic suppliers of working dogs. This area is driven by the relative cost of transportation for vendors in different locales, sale price being insufficient to cover increased transportation cost based on distance to customer, and the impacts of regulations such as the Buy American Act—which requires federal agencies to procure domestic materials and products—on vendors who primarily act as importers of working dogs. Additionally, certain geographic areas lack the personnel or expertise resources to properly perform evaluation and screening of potential working dog candidates. Finally, increased distance between a vendor and customer increases the potential level of fatigue of canines during transportation and may negatively impact selection rates as

fatigued dogs may not perform as well as “fresh” dogs. This may reduce a vendor’s pool of available customers to those within a certain distance range as they will want to minimize canine travel fatigue.

- **Breed Specialization:** The breed of dog that is bred by a breeder or procured by a vendor can create influences on a working dog producer. Drivers such as the pedigree of the canines that the breeder has in inventory can affect sale price and market demand. Certain breeds, like those used for sporting or hunting dogs, can be more profitable than those breeds preferred by the various government customers creating demand for working dogs. Another driver is that the inherent traits of the breed being purveyed by a vendor may affect the general performance of the breed against other breeds in performing working dog tasks. In other words, some breeds are better than other breeds at certain tasks, which may influence who the vendor intends to market their inventory of canines to.

- **Capability:** The final area of influence is centered on the concept of vendor capability. The capability of a vendor to provide training and socialization to a canine is driven by the input costs to raise, house, and sustain a canine until maturity—along with the expertise of the vendor’s workforce to provide sufficient training to meet working dog performance standards. This area is also driven by experience of the vendor and their workforce with a particular breed or breeds and existing relationships with vendors of particular breeds within the supply chain.

2. Market Segmentation

From the synthesized data, we developed a model to segment the suppliers based on the level of information they have regarding government procurement and the level of availability of their business to compete within the domestic canine marketplace. The model was divided into two dimensions to demonstrate and assist in understanding how the vendors within the market are positioned relative to the likelihood that they could

successfully supply dogs to the government. We described these dimensions as Availability and Information.

- **Availability:** This dimension consists of three components: capability, capacity, and willingness. *Capability* is the entity's expertise in breeding, training, or evaluating working dogs. *Capacity* is the firm's possible output based on financial, human resource, and infrastructure constraints. *Willingness* is a simple measure of whether the firm is willing to conduct business with the government. The level of availability represents the likelihood of the firm supplying working dogs to the government. The higher the level of availability, the higher the probability.

- **Information:** This dimension consists of a business entity's familiarity with government contracting and their knowledge of the use and treatment of working dogs within the federal departments or agencies. The level of information represents the extent of the firm's understanding of the federal government's processes, objectives, and mission sets that influence their decision in conducting business with the government. Like the levels of availability, a high level of information means a high likelihood of a firm supplying working dogs to the government.

Using the dimensions established, the model was partitioned into four quadrants to categorize the firms based on their current levels of availability and information. These quadrants are key in developing strategies necessary to move domestic sources into the most optimum or more ideal category to support the GWD program. Each vendor was categorized as compatibles, untapped, prospects, or incompatibles.

- **Compatibles:** These firms possess all the capability, capacity, willingness, information, and experience to do business with the government. In general, the vendors that are categorized within this quadrant are firms that are actively doing business with the government and have both a high level of availability and a high level of information.

- **Untapped:** These firms have the capability, capacity, and willingness to do business with the government but lack the necessary information to do so. In most cases, these firms are either misinformed or unaware of the channels available to enter the government market. The vendors that are categorized in this quadrant are considered to have a high level of availability but a low level of information.

- **Prospects:** These firms are very familiar and often have a working knowledge of or previous experience doing business with the government but lack sufficient capacity, capability, or willingness to do so. The vendors that are categorized in this quadrant are considered to have a low level of availability but a high level of information.

- **Incompatibles:** These firms lack the capability, capacity, and willingness to do business with the government and lack the necessary or accurate information to do so. These vendors are usually either new to the working dog industry or are organizations that have opposing points of view on the government's utilization of canines. The vendors that are assigned into in this quadrant are considered to have a low level of availability and a low level of information.

Figure 7 shows the quadrants (compatibles, untapped, prospects, and incompatibles) plotted against the axis dimensions (availability and information).

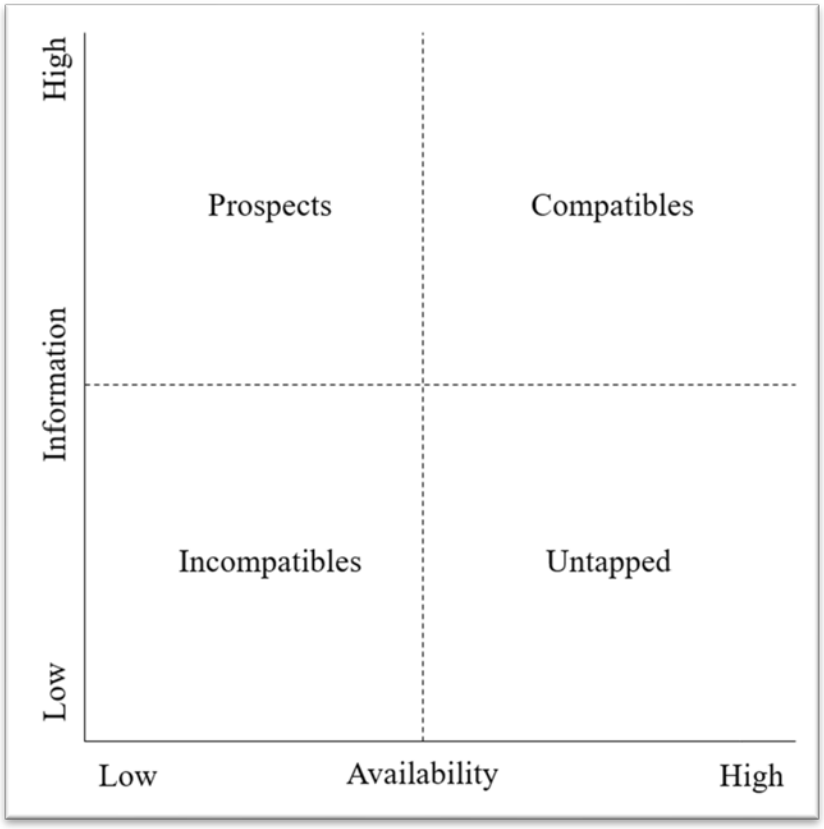

Figure 7. Market Segmentation Model

3. Proof of Concept

To test the fidelity of the model, we used the RFI data as a naive proof of concept (see Figure 8). The responses to questions regarding SAM registration, breeding and reselling capacities, means to forecast demand, predominant customers, previous work with the government, and annual revenue were converted into information and availability scores and plotted into the model (see Appendix E, page 118 for details about score conversion).

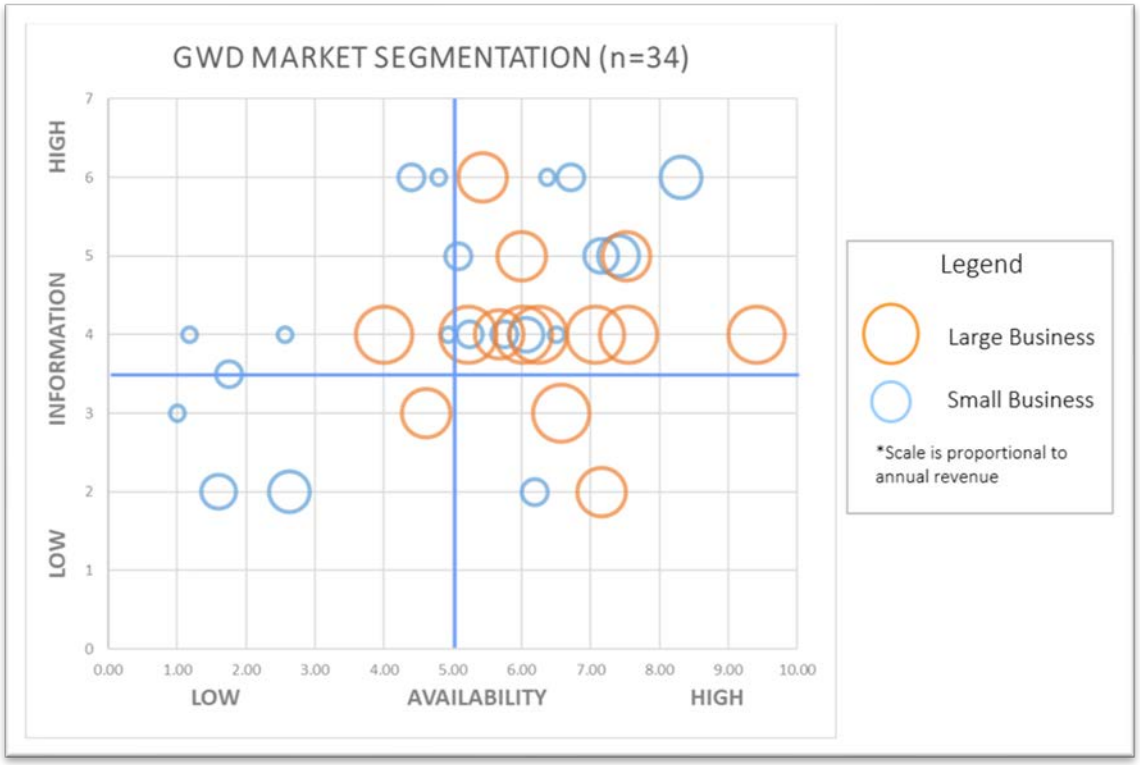

Figure 8. Market Segmentation Model Proof of Concept

Despite the lack of a full data set representing all breeders, trainers, and vendors that exist within the domestic marketplace, a conclusion can be drawn from the data output that the compatibles quadrant is overrepresented. This is to be expected if our model is valid. Our data was comprised of 29 respondents that had experience doing business with the government in some capacity. The model was able to appropriately place these respondents within the compatibles quadrant. Additionally, the model was also able to properly place the remaining 13 respondents into the appropriate quadrant. Although these vendors have not done business with the government, they are not automatically considered incompatibles. The three vendors that had a high level of availability but a low level of information were categorized as untapped, whereas the five vendors with low levels of availability but high levels of information were categorized as prospects. The remaining five vendors who had both low levels of availability and information were categorized as incompatibles.

E. CONCLUSION

Exhibited in the results of our research is the existence of a shadow inventory within the domestic market that cannot be captured through traditional government data collection techniques. Simply put, firms will not respond to a government request if they are not aware of or looking for opportunities, or are not interested in conducting business in the government sector of the market. The fidelity of our model can be increased by using a current, accurate, and complete set of data that can be obtained by conducting rigorous market intelligence activities. The model can assist category managers on the GWD CMT, as well as category managers responsible for other small categories of spend with limited market intelligence data, to make informed decisions and enable the movement of vendors from quadrant to quadrant. The result of our market segmentation became a key element in the development of our small business communication plan. We discuss this plan, along with other recommendations and areas of further research, in greater detail in Chapter V.

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V. RECOMMENDATIONS AND AREAS OF FUTURE RESEARCH

In this chapter, we outline the actionable recommendations, contributions, and managerial implications of this research, as well as areas for future research. We begin with our recommendation that the GWD CMT utilize a government-wide communication plan to synchronize and streamline its marketing efforts to improve the domestic supply of working dogs.

A. ACTIONABLE RECOMMENDATION

This research sought to assist the GWD CMT and their representatives in the AFICC to improve the management of the working dog category of spend and bolster the readiness of the working dog supply chain to counter possible interruptions within foreign markets for an extended period. The AFICC team requested that we explore and develop ways to improve G2B communication—in particular, communication with domestic small businesses within the working dog industry. Using the results of the attribute mapping exercise and the market segmentation model, we developed the GWD Small Business Communication Plan (SBCP). The plan in its entirety is in Appendix E.

To achieve the primary objectives of the GWD CMT, we leveraged the capability of the model to segment and categorize suppliers within the domestic market and to formulate actions deliberately designed to influence vendors within each quadrant. The approach for each quadrant was guided by a target marketing statement tailored to meet the goals of the SBCP, which are to increase public awareness of GWD programs, improve relationships between government and industry, and provide tools and resources to industry to facilitate greater participation in federal working dog programs. The SBCP introduces marketing activities, which act as marketing strategies, intended to move firms within the industry from one quadrant to another within the market segmentation to another as shown by the arrows in Figure 9. (This figure shows a sample data set, including the anticipated shadow inventory, for illustrative purposes only). Descriptions of these quadrants can be found in Chapter IV.

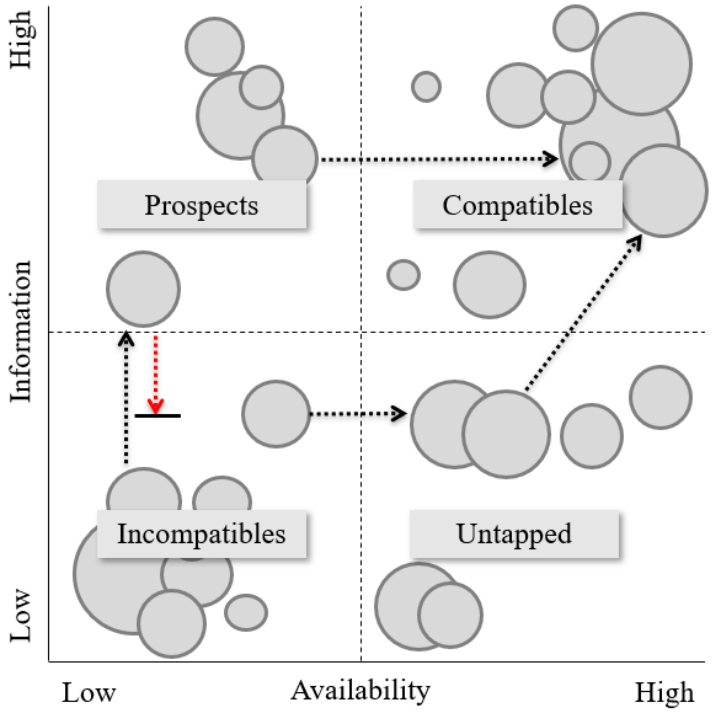


Figure 9. Marketing Activity Visualization

The marketing activities, or strategies, are intended to increase the levels of information or availability of the vendor and encourage movement towards a more advantageous quadrant. This movement of vendors from one quadrant, or segment, to another by utilizing marketing activities is represented with black arrows. The black line blocking the red arrow is intended to denote the implementation of marketing activities designed to stop or mitigate a vendor's movement to a less advantageous quadrant within the market segmentation. The strategies contained within the marketing activities, as shown in Table 3, should be pursued to improve the level of availability or information of each vendor with the intent of growing the available pool of domestic working dog vendors. For additional information on the implementation of these strategies, see page 120 of Appendix E.

Table 3. Marketing Activities

Marketing Activity	Description
Print/Digital Media	• GWD Program representatives and GWD Marketing Team Members should participate regularly in interviews for news organizations, industry magazines or periodicals, websites, and other news sources. • To facilitate a centralized repository of standardized information across all departments a single "one-stop-shop" website should be deployed and maintained.
Attendance at Industry Events	• Representatives from the GWD Program as well as the GWD Marketing Team should regularly attend industry events such as conferences sponsored by AKC, trade shows organized by specific breeding clubs, and webinars led by various canine organizations to raise awareness and improve relationships with the working dog industry. • The GWD Team should team up with industry associations such as the AKC to lead events like the detector and patrol dog competition.
Tools and Resources	• Tools should be made available through the proposed GWD Program website which covers the acquisition process for working dogs, information for firms on becoming registered to do business with the government. • Resources, such as monetary assistance and expertise, should be made available in several forms to interested firms.
Consistency of Message	• To be able to ensure consistency of message and synergy of effort the execution of the activities described above should be planned, coordinated, and conducted to address a government-wide marketing approach.

For the SBCP to be effective and achieve its goals, we determined that the formulation of a dedicated marketing team, attached to the GWD CMT, would be critical to the success of any marketing efforts. This team will be properly positioned and empowered to ensure consistency of message and synergy of effort. The execution of the activities within the SBCP should be planned, coordinated, and conducted to address a government-wide marketing approach to provide efficacy and eliminate redundancies.

Although the key intent of the communication plan is to increase awareness and participation of small businesses, the marketing activities described in the SBCP can also positively influence large businesses within the industry.

Our research is focused on improving the domestic supply of working dogs; however, we recognize that the methodologies that we used and the model that we developed can be used as a blueprint for additional research. We now discuss some of the specific contributions and managerial implications of our research.

B. CONTRIBUTION AND MANAGERIAL IMPLICATIONS

Despite the importance of working dogs to our national security, there have not been recent studies (or efforts) to enhance the domestic supply available to government buyers. This research acts as the first significant review of the working dog marketplace since Frost's (1990) work in the early 1990s. Increased congressional scrutiny of working dog procurement has increased the need for policy-makers to have current insight into the domestic marketplace and understand how to improve working dog production as part of the defense industrial base.

This research has developed a methodology for exploring new, emerging, opaque, or opportunistic broker markets. It is possible to gain an enhanced understanding of markets that may possess shadow inventory through the application of (a) spend analysis to determine the government's position in a market, (b) in-depth interviews with subject matter experts and key stakeholders inside and outside of government in order to understand factors that influence producers, and (c) incorporation of marketing tools such as attribute mapping and segmentation.

This work is particularly germane given the recent rise of the COVID-19 pandemic and the resultant impacts on global trade, shipping, and international transportation of goods. The response to the requirements for emergency medical supplies and services has led to the need to explore opaque markets in areas not recently or previously explored (e.g., textiles outside of China) and to evaluate burgeoning markets of opportunity (e.g., 10 percenters, or brokers that emerge within a market during crisis to capture profits while not adding value to the supply chain). While our research applied this method to working dogs

and to understanding the factors that influence domestic production, it is also applicable to a host of other categories of spend. These disruptions can create and intensify supply chain risk and can impact the continued performance of essential purchasing functions. The dimensions of the market segmentation model that we developed—information and availability—have near universal application throughout government procurement. These concepts can become key market intelligence parameters to developing knowledge and insight into a vendor's position within the B2G market. Our research demonstrates that a strong foundation of insight or intelligence into a market is the first step in addressing risk and bridging supply chain gaps.

Now we discuss recommendations for further research, which includes exploration of possible applications of the market segmentation model that we developed.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

The discussions and recommendations in this study focused primarily on improving G2B communication. However, during the study, we identified several factors affecting the domestic supply of working dogs that we were unable to explore in greater detail. We propose further research be conducted to address the following topics.

1. Strategic Selection Sites and Vendor Location

One of the areas of concern raised by our interviewees was the impacts of extended travel on their working dogs' performance during evaluation. In the case of the DOD, as an example, vendors are generally required to transport their canines to a single location for evaluation and purchase. This travel distance may place strain on a working dog prior to selection. Additionally, vendors may be forced to absorb a portion of the transportation cost, thus affecting the profitability of doing business with the government. To address this, we explored the possible impacts of establishing selection sites throughout the country to reduce vendor travel. We applied a combination of linear programming models—a minimal covering model and a transportation model—to define regions that captured the majority of known vendors and minimized their travel distance to a selection site. This research is contained in Appendix F. We estimated, with four selection sites and a maximum vendor travel distance of 500 miles for the 37 vendors in our data set, that 35,884

miles could be saved and the average travel distance per vendor reduced to 236 miles. We recommend that further research be conducted to validate our findings and explore the costs and benefits associated with the establishment of additional selection sites.

Additionally, it may be beneficial that further research be done to better understand how the concentration of working dog vendors in the European market influences U.S. government buying practices. According to one of the individuals that we interviewed, "In Europe, you can stop at one location and screen up to 300 dogs. You are not able to do that here [in the United States]." When taking into consideration the DOD's "buy-trips" to Europe to procure working dogs directly, it appears that the density of qualified vendors with large inventories increases the efficiency of procurement and selection teams. Further research is needed to confirm this assumption.

2. Overhaul Contract Vehicles

Another area of concern raised by our interviewees was the inconsistencies in government contracts between the various departments that acquire working dogs. The terms and conditions of a contract dramatically impact the potential success of the government-to-industry relationship. The lack of long-term procurement relationships in this market sector hinders industry's desire to make long-term investments in support of the government market. In our research, we determined that there is not a unified approach to working dog procurement throughout the federal government.

We recommend that research be conducted to understand what contractual agreements the government can institute that promote vendor participation in the marketplace through profitable long-term contractual relationships while also supporting competition, small business participation, and the entrance of new firms into the marketplace. This could include research to understand the effects of combining different types of contractual relationships or the effects of incorporating commercial best practices. Research might also be conducted to measure the effect that refining some potentially unnecessary restrictions might have on the motivation of vendors to participate in the government market. Investigating the use of indefinite delivery contracts with minimum

purchase requirements, combined with on-ramping and off-ramping of contractors, may also be fruitful ground for this research.

3. Working Dog Culture

Among those interviewed, there is general agreement that the most significant difference between the American and European markets for working dogs is the influence of working dog culture in the raising of canines. Within the European market, there is a prevalent culture of dog clubs, high-level working dog competitions, and constant socialization and training of working dogs in diverse environments. We recommend future research be conducted to determine whether the difference in culture between the American and European market has a significant impact on the quality or capability of the canine to perform working dog tasks. Additionally, further research should be conducted to determine whether these cultural aspects of the European working dog market can be replicated in the United States, as it may enable improved yield from available domestic working dog inventories.

4. Utilization of Segmentation Model

In our research, we were able to categorize and segment the supply stakeholders in the working dog industry by the level of information and the level of availability that they possessed. We recommend that a similar approach be used in other spend areas that are not clear (i.e., opaque) or well-established, such as emergency requirements prior to the COVID-19 pandemic (e.g., masks, face shields, and other personal protective equipment). Gaining an increased understanding of these opaque markets can allow for the implementation of marketing strategies to address market issues, such as G2B communication, as shown by the results of our research.

Additionally, research can also be conducted to determine how the concepts from the segmentation model can be applied to well-established requirements. Considering that this requirement, working dogs, is relatively small compared to the Air Force's top areas of spend—such as professional services, aircraft components, and maintenance of facilities—we recommend future research that would utilize the segmentation model in

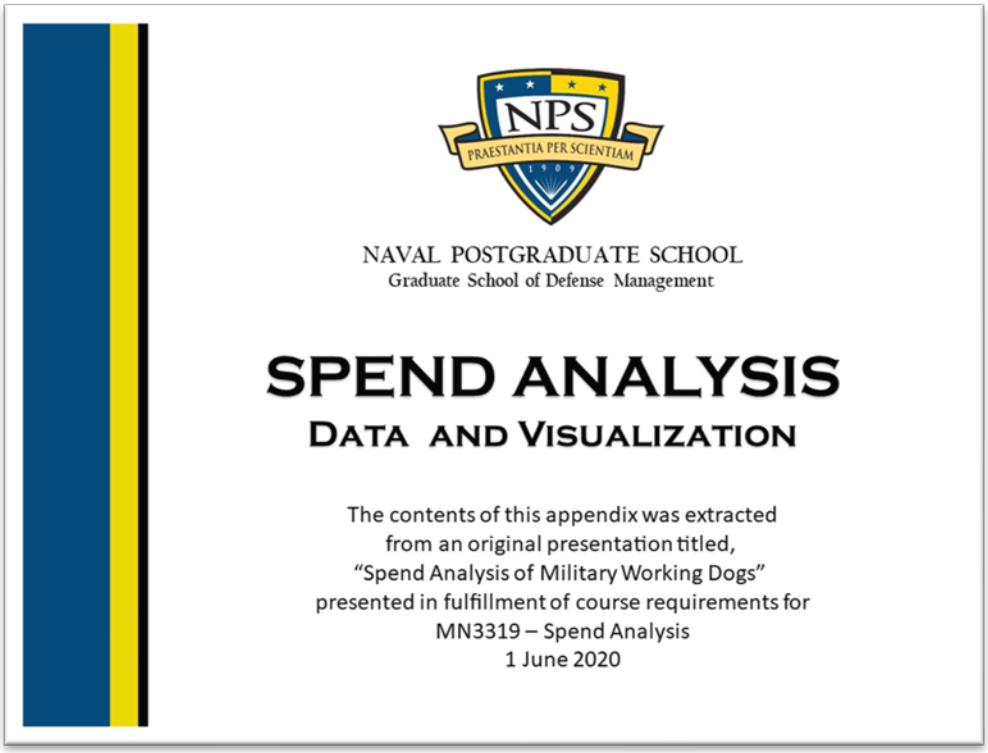
pursuit of identifying or developing strategies that can be used as tools to improve government and business relationships.

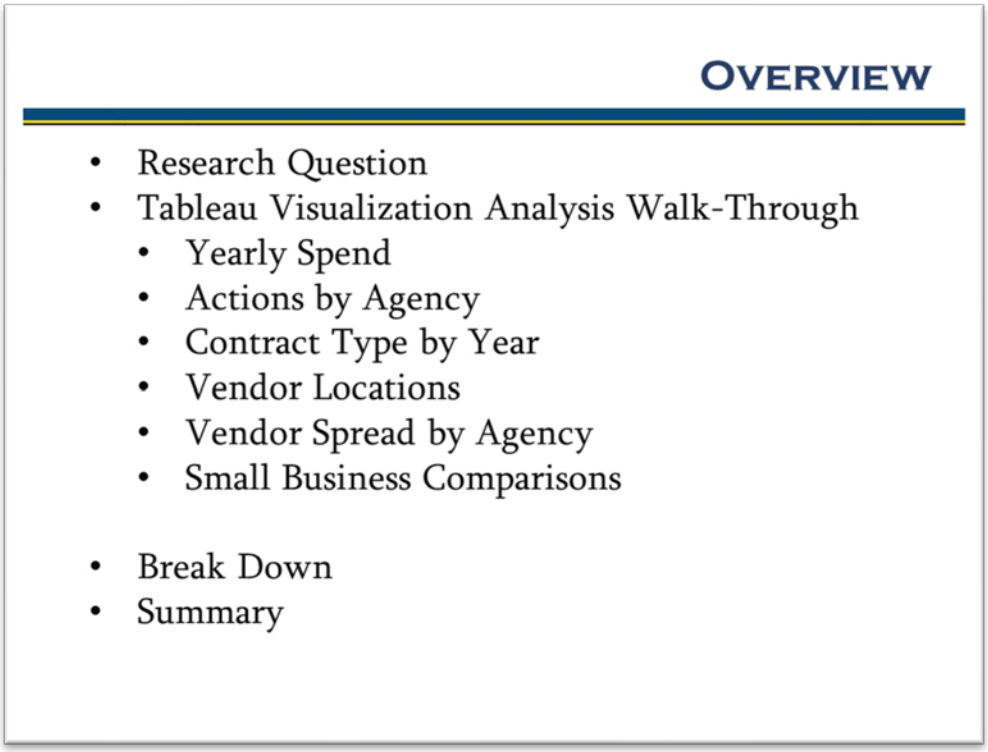
D. CONCLUSION

This research aimed to answer our primary question: What are the factors affecting the domestic supply of working dogs, and what actions can the federal government take to improve the domestic supply of working dogs? We utilized a mixed methods approach and applied both quantitative and qualitative techniques to obtain knowledge and insight into the domestic working dog market. We started by employing business intelligence tools and methods, such as spend analysis and interview, to gather information about the domestic market of working dogs and to understand the factors affecting the domestic supply of working dogs. This information was then synthesized through attribute mapping and market segmentation to develop marketing strategies necessary to address weaknesses in G2B communications for this market.

While working dogs and their procurement do not generally make the headlines in the news, their importance should not be underestimated. Despite continual and rapid advances in technology, working dogs remain a vital and irreplaceable asset to national security. “Humans are continually rediscovering that technology cannot match many canine senses and other inherent abilities, and they also realize that dogs continue to remain loyal even as equipment and conflicts evolve around them” (Watson, 2019, pp. 89–90). This paper provides the most comprehensive research on working dog procurement conducted in the last 15 years and provides a valuable methodology for uncovering and understanding opaque or emerging markets. The application of these concepts can lead to better outcomes for procurement decision-makers and greater value for the taxpayer.

APPENDIX A. SPEND ANALYSIS DATA AND VISUALIZATION





PROBLEM STATEMENT

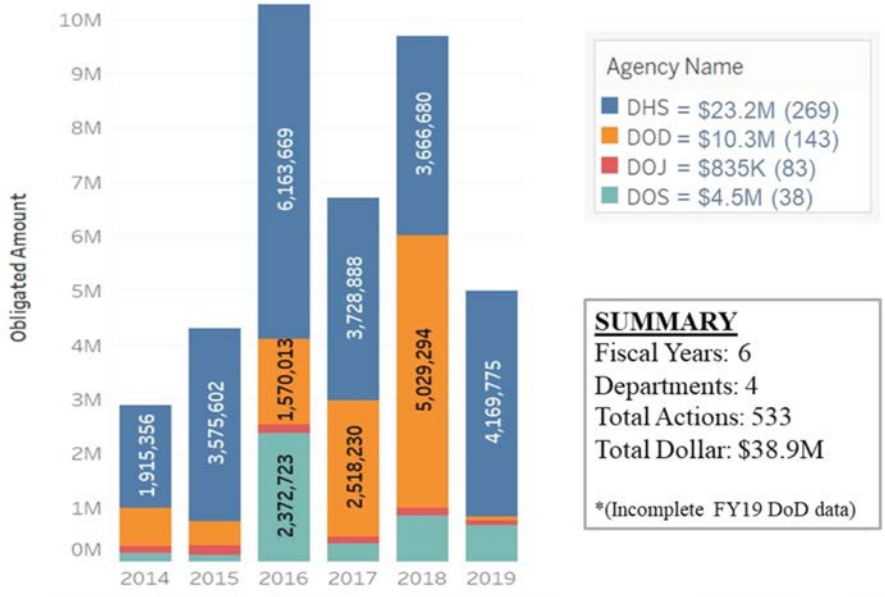
•How is the DoD buying Working Dogs compared to other agencies?
- Do we utilize different contract vehicle types?
- Do the different buying agencies focus their buying in different geographic regions or states?
- How many vendors are we buying from (concentration/competition)?
- How do we use small business in comparison to other departments?

•Agencies we looked at:
- •Department of Defense (DoD)
- •Department of Justice (DoJ)
- •Department of State (DoS)
- •Department of Homeland Security (DHS)

•Fiscal Years Analyzed: 2014 – 2019

•Limitations: DoD Data for FY 2019 was incomplete

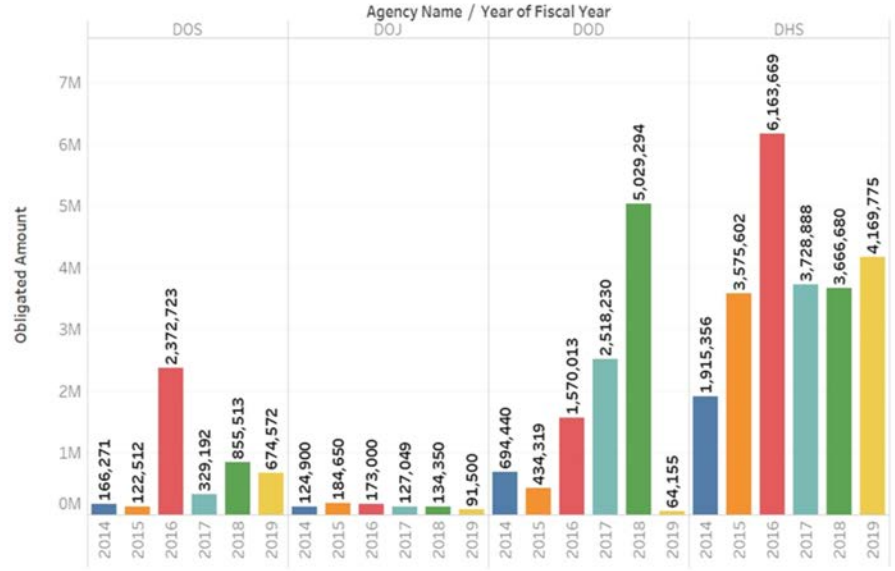
YEARLY SPEND BY DEPARTMENT



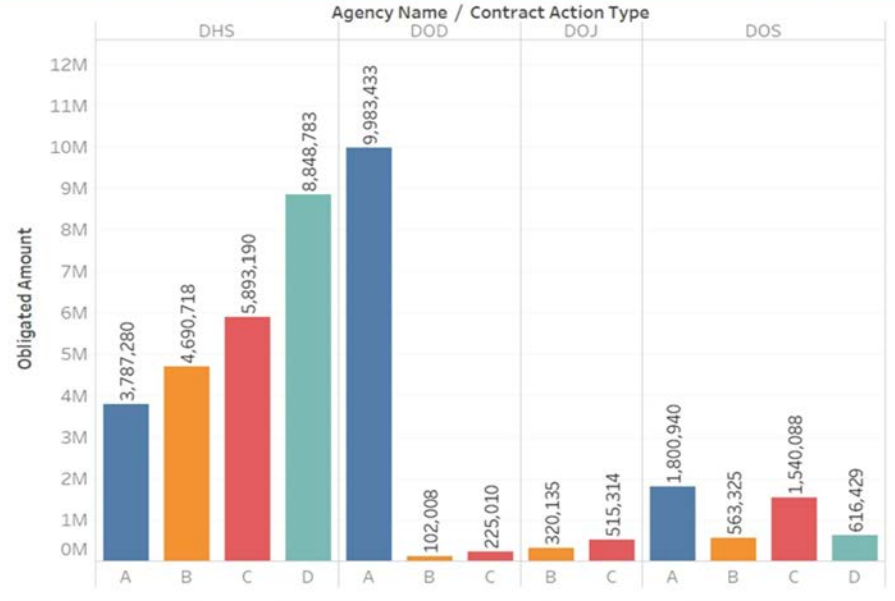
SUMMARY
Fiscal Years: 6
Departments: 4
Total Actions: 533
Total Dollar: $38.9M

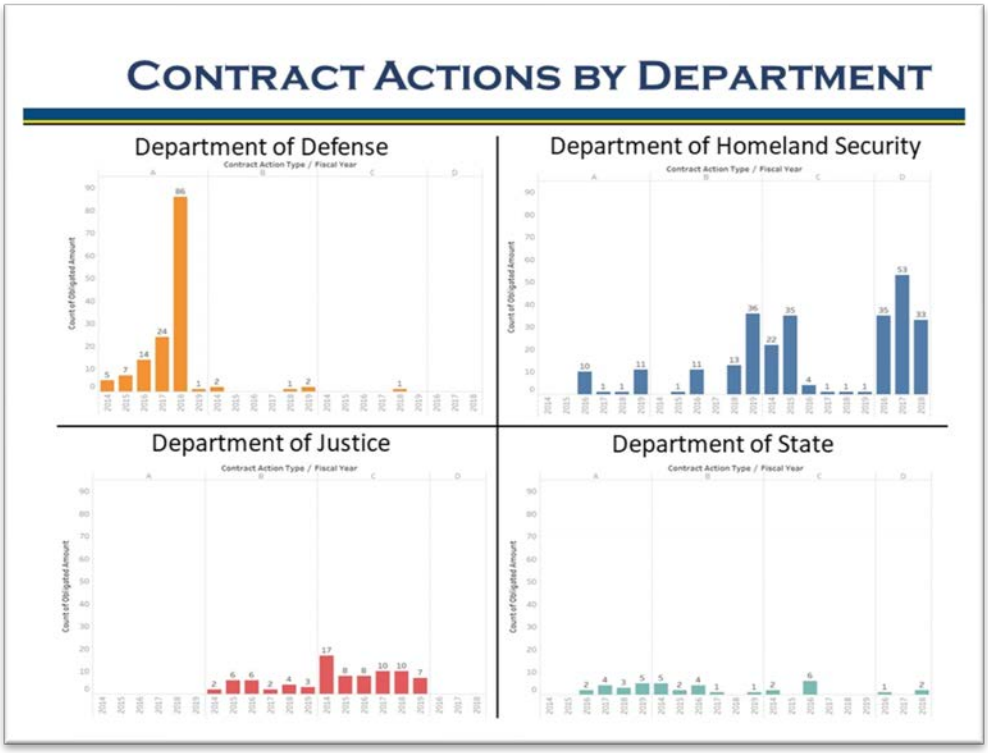
*(Incomplete FY19 DoD data)

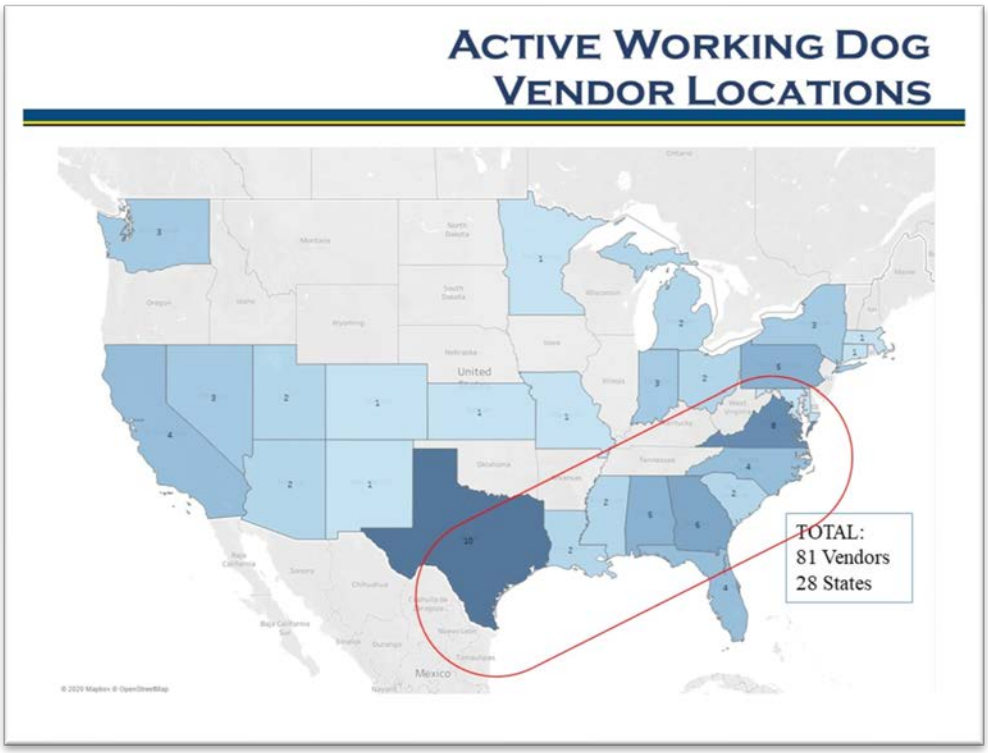
YEARLY SPEND BY DEPARTMENT

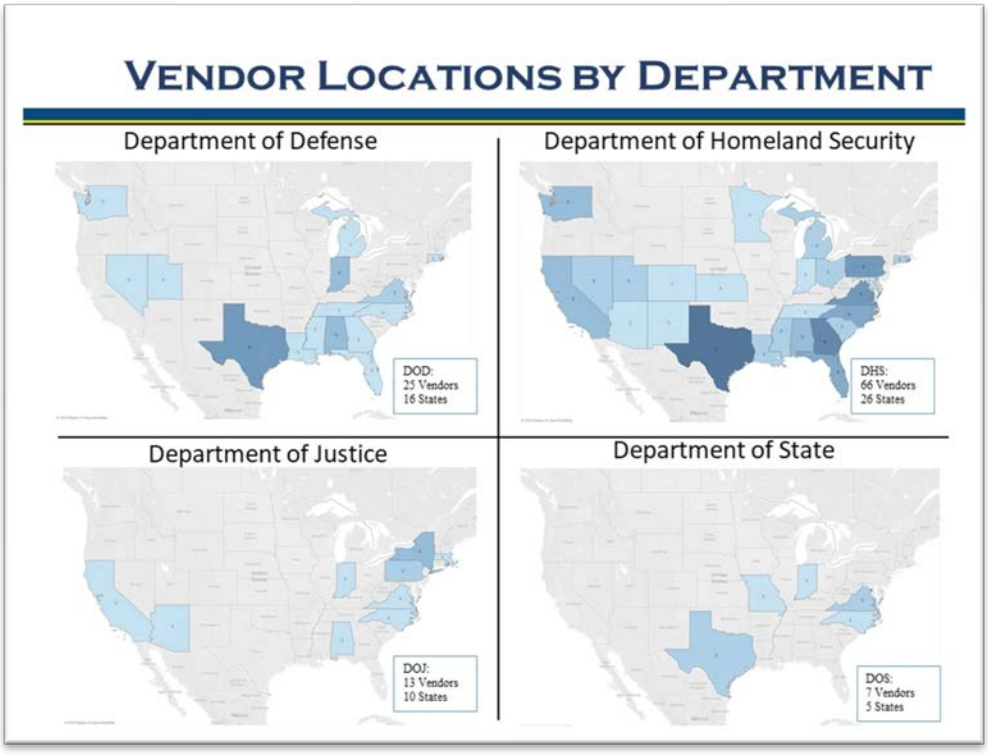


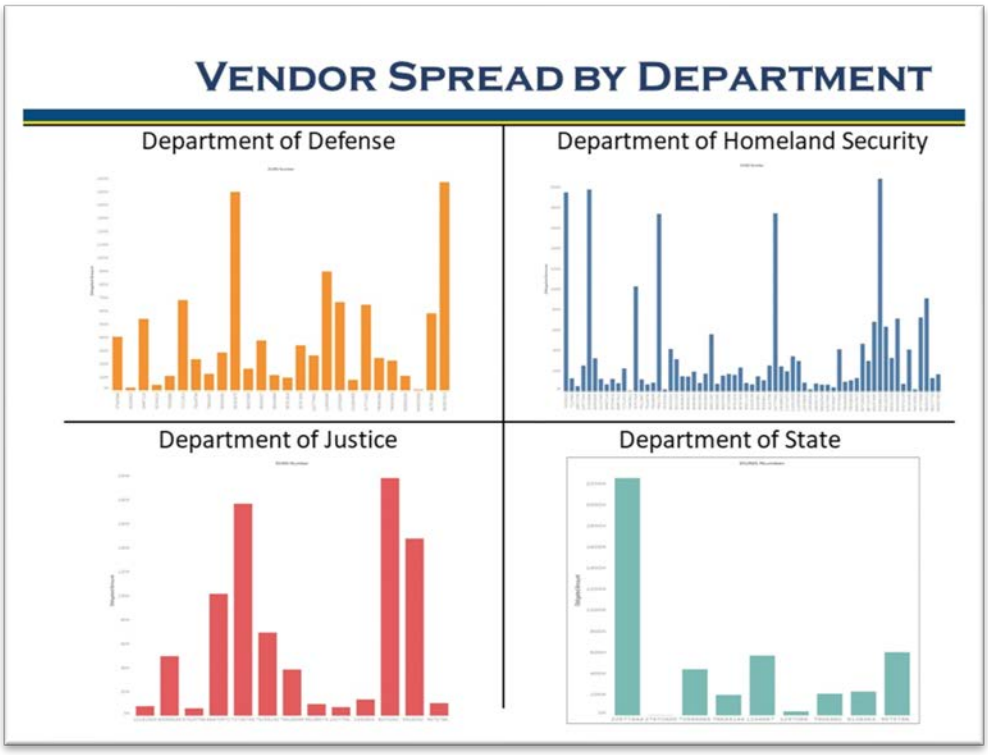
CONTRACT TYPE BY DEPARTMENT

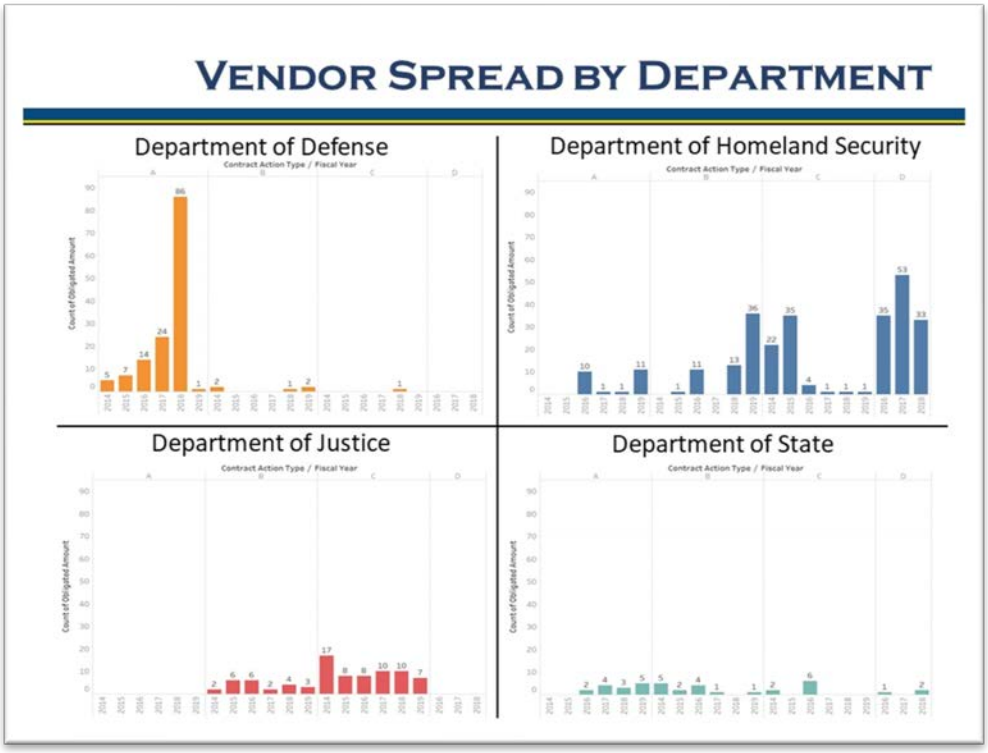


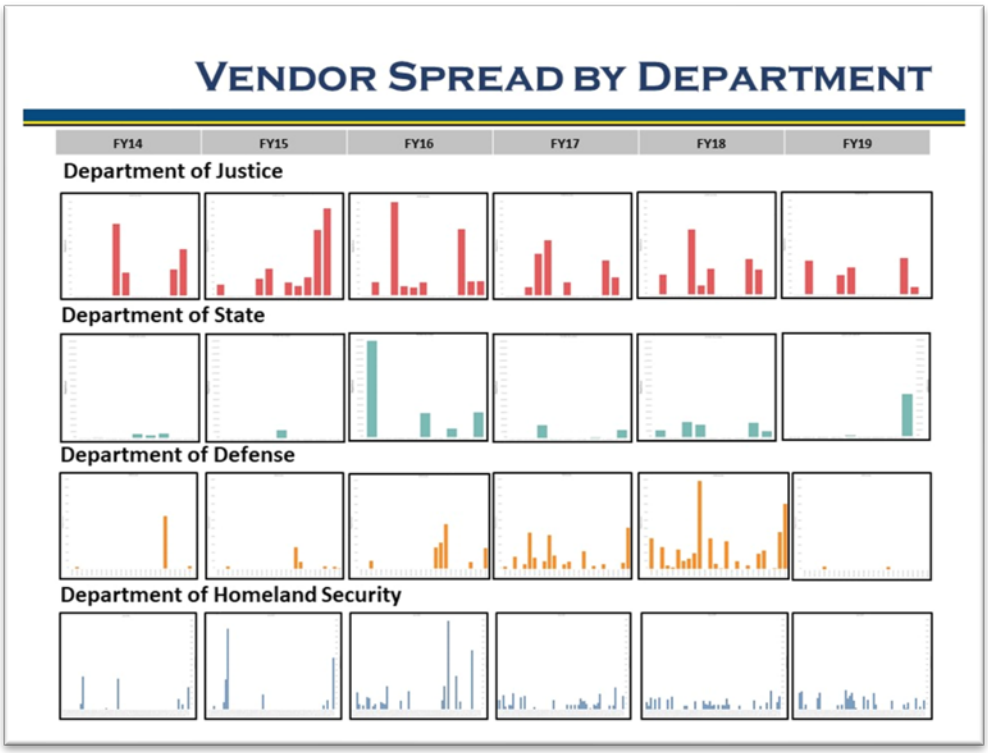

CONTRACT ACTIONS BY DEPARTMENT
Department of Defense
Department of Homeland Security
Department of Justice
Department of State


ACTIVE WORKING DOG VENDOR LOCATIONS
TOTAL:
81 Vendors
28 States


VENDOR LOCATIONS BY DEPARTMENT
Department of Defense
DOD:
25 Vendors
16 States
Department of Homeland Security
DHS:
66 Vendors
26 States
Department of Justice
DOJ:
13 Vendors
10 States
Department of State
DOS:
7 Vendors
5 States


VENDOR SPREAD BY DEPARTMENT
Department of Defense
Department of Homeland Security
Department of Justice
Department of State

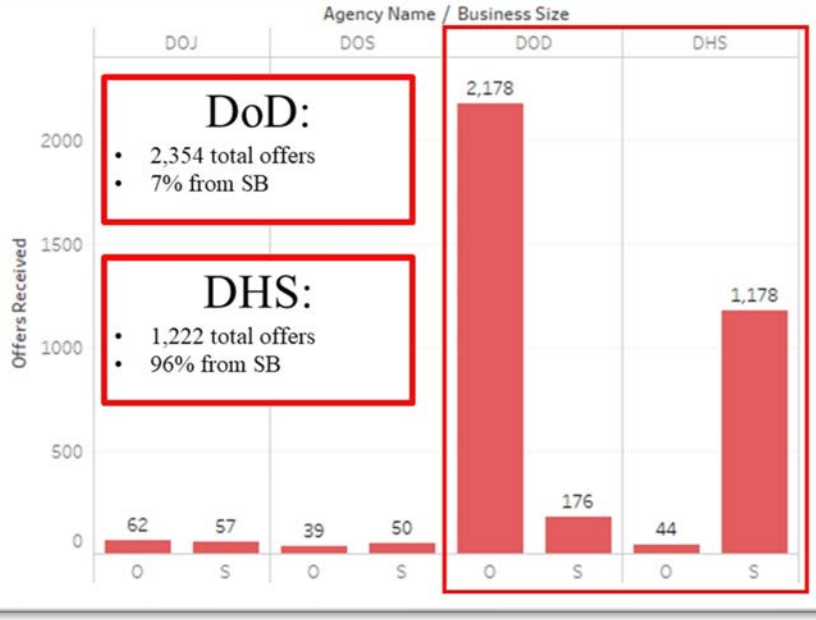

VENDOR SPREAD BY DEPARTMENT
Department of Defense
Department of Homeland Security
Department of Justice
Department of State


VENDOR SPREAD BY DEPARTMENT
FY14
FY15
FY16
FY17
FY18
FY19
Department of Justice
Department of State
Department of Defense
Department of Homeland Security

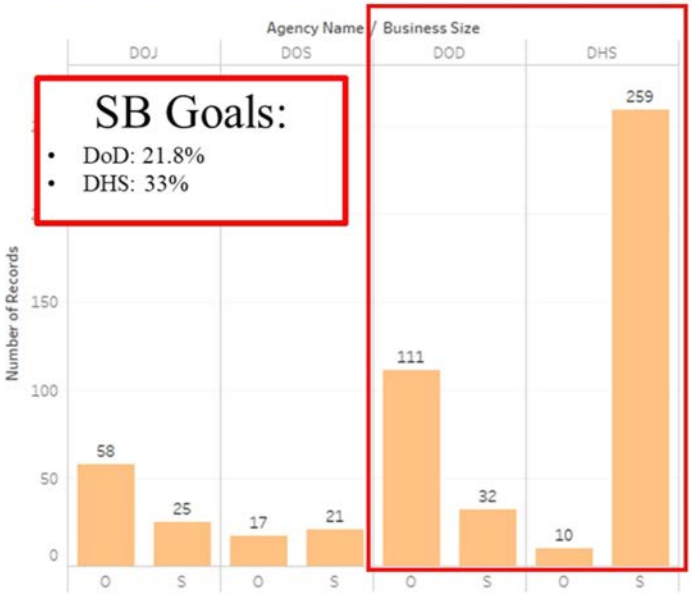
Average Spending Per Vendor

Department		FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
DHS	Minimum	$ 16,728.00	$ 58,140.00	$ 5,000.00	$ 17,061.00	$ 6,900.00	$ 9,000.00
	Average	$ 273,622.29	$ 446,950.19	$ 308,183.47	$ 138,106.96	$ 126,437.24	$ 166,791.00
	Maximum	$ 587,642.40	$ 1,442,092.07	$ 1,581,844.55	$ 389,675.00	$ 331,100.00	$ 342,000.00
	Total	$ 1,915,356.00	$ 3,575,601.50	$ 6,163,669.47	$ 3,728,888.00	$ 3,666,680.00	$ 4,169,775.00
	Vendor Count	7	8	20	27	29	25
	Percent of Avg spending per vendor	14%	13%	5%	4%	3%	4%
DoD	Minimum	$ 19,660.00	$ 6,600.00	$ 81,000.00	$ 28,000.00	$ 6,750.00	$ 29,355.00
	Average	$ 231,480.04	$ 72,386.53	$ 261,668.75	$ 167,882.00	$ 251,464.68	$ 32,077.50
	Maximum	$ 645,497.12	$ 264,800.00	$ 552,562.52	$ 505,950.00	$ 1,084,050.00	$ 34,800.00
	Total	$ 694,440.12	$ 434,319.16	$ 1,570,012.52	$ 2,518,230.00	$ 5,029,293.50	$ 64,155.00
	Vendor Count	3	6	6	15	20	2
	Percent of Avg spending per vendor	33%	17%	17%	7%	5%	50%

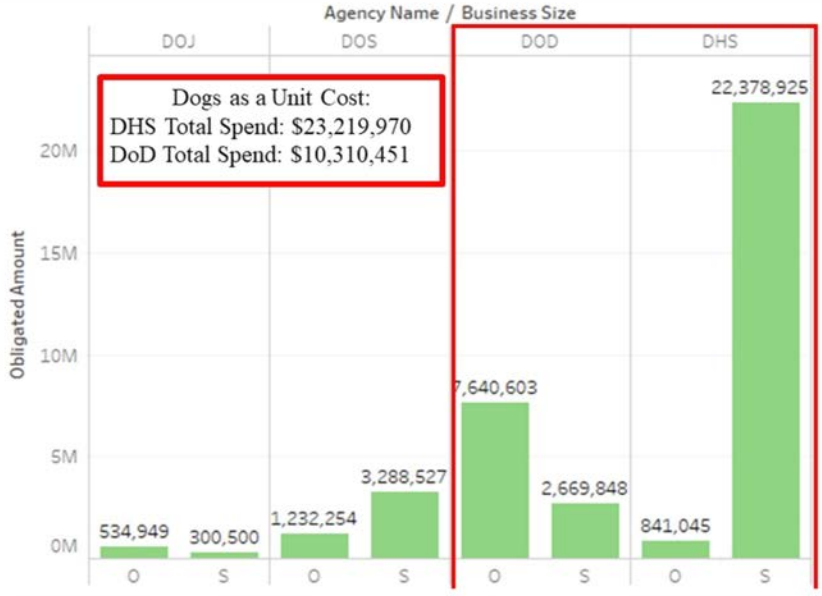
Small Business Offers Received



SMALL BUSINESS CONTRACT ACTIONS



SMALL BUSINESS OBLIGATED AMOUNT



Agency Small Business Concerns

What does it all mean?

- How is the DoD buying Working Dogs compared to other agencies?
  - How is our spending different from other departments?
    - Except for FY16, other departments appear to have more consistent Working Dog spend compared to the DoD. Although the data available shows an exponential yearly increase in the DOD's spend, it is inconclusive without the FY19 data
    - DoD had majority A-type contracts and some B-type
    - DHS is continually shifting strategies in their contract vehicle
  - How is our vendor base different from other departments?
    - DoD has had relationships with 25 vendors across 16 states (vs. DHS 66 vendors across 26 states)
    - DoD vendor base is concentrated across the SE seaboard
    - DoD spends excessive amounts with a few vendors versus "spreading the wealth" and increasing its vendor base
  - How does our small business use differ among departments?
    - DoD spends more on, and awards more contracts to, other than SB
    - Offers received from SB: DoD = 7% & DHS = 96%
    - Contracts Actions awarded to SB: DoD= 22% (21.8% goal) & DHS= 96% (33% goal)
    - Inferred Causes: Issues with DoD's requirements; DHS has higher SB Goals; DHS has more incentive to win hearts/minds from border state communities

SUMMARY

- Research Question
- Tableau Visualization Analysis Walk-Through
  - Yearly Spend
  - Actions by Agency
  - Contract Type by Year
  - Vendor Locations
  - Vendor Spread by Agency
  - Small Business Comparisons
- Break Down
- Summary

APPENDIX B. INTERVIEW TOPICS AND SUBTOPICS

The following are the consolidation of the participants' responses and are arranged by key points and relevant information by primary topics and subtopics to identify patterns and themes within the responses.

Issues in the domestic market

- It's not about genetics or breeding programs, it's about changing the way American's raise dogs.
    - Socialization, dog clubs, dog sport competitions.
- It's a lifestyle in Europe to raise dog's in this way.
- Claim: There isn't a shortage of dogs, we aren't buying the qualified dogs that are offered. Breeders could produce 1000–1200 dogs per year (met this supply during the war)
- Mismatch between supply and demand
    - The marketplace isn't transparent
        - It's difficult to match up supply and demand.
        - There is enormous demand.
    - European dog clubs have their price in their head
        - American dogs are keeper and not usually for sale
- Proper incentives do not exist within the marketplace for breeders to serve the government market
    - Breeders need to be able to produce enough dogs to be able to afford to maintain their kennels and to have a living wage
    - Alternative markets have better monetary incentives: $5k for a puppy at 10 weeks vs $6k at 10 months
    - Need to pay more for the critical training time between 10 weeks and 10 months

Differences between domestic and foreign dogs

- Claim: Domestic bred dogs are a better option than foreign
    - Claim: domestic bred dogs are cheaper than foreign
    - Availability in foreign markets may be curtailed.
    - Depending on foreign bred dogs long term is not a viable solution
    - Not just an issue of cost but of national security
    - Quality of dogs from overseas is declining
    - Advantages of domestically bred dogs versus foreign
        - Claim: We don't know what we are getting genetically, training wise from a foreign purchase
        - Knowing the product will lead to lower wash out rates in training
    - Claim: Domestic marketplace has some but not all of the capability needed

        - More serious breeders are needed, increase the frequency of litters
        - Claim: training capability exist within a portion of the domestic breeders to produce green dogs
    - Foreign breed dogs are raised in a culture/lifestyle that better prepares them to meet selection
        - Includes capability and adaptability
        - American culture of animal rights groups/animal protection laws is inhibiting breeders ability to train dogs for acclimatization, experiences, socialization as well as their desire to be in the business due to societal and political pressure
- Counter Claim: Domestic Dog Market (disadvantages):
    - Cost of labor
        - Very expensive (Claim: The only factor that really differentiates)
    - Experience and acquaintance of the factors (culture, etc.)
    - Lack of understanding and interest of the requirements in the local market = high failure rate
    - WE treat them as family not animals
    - Foreign producers always underbid
    - Very expensive to breed dogs
- Claim: high impact of genetics/ phenotyping on the success rates of dogs
    - Can identify dogs that are strong, personality traits (drive/desire)
    - Can produce more successful outcomes with less dogs
    - Not just genetics matter but also environment, training, trainers

Issues with communication between government and supply chain

- Historical issues with understanding expectations
- Where the dogs originate is sometimes unknown
- Breeding pipeline is an issue, knowing the dogs age.
- U.S. breeders don't know how to work with the government
    - Groups of breeders working together to present dogs
    - Lack of consistency with the requirements for dogs
        - Would be incredibly useful and provide confidence to breeders and trainers that they are moving in the right direction to meet the governments need Would be incredibly useful and provide confidence to breeders and trainers that they are moving in the right direction to meet the governments need
    - Informal requirements "changing perspectives" are levied on MWD candidates
        - Need to work with CO's to understand what they are valuing
- There is an adversarial relationship.
    - Those running the procurements are considered to have a chip on their shoulders.
    - No discussions are allowed in regards to testing outcomes and with the lack of a guarantee dogs are eliminated for inconsequential reasons

Issues with Procurement system

- We do not accept commercial guarantee on MWD candidates.
    - Due to this we levee requirements that are much harder, much more stringent than any other customer.
    - This motivates an overly cautious perspective that keeps us from procuring dogs that would otherwise allow us to meet our requirement.
- 30 days is not enough to get everything done that we ask for under the BPA
- Services/agencies procure dogs in different ways, pre-trained, sole-source vs. BPA.
- It is not feasible for dog breeders/vendors to hold the additional stock required by the government
- Puppy Farm - Yield from a litter of 10 is usually 2–4 that will pass selection but all will require the training man hours, socialization, and medical.
- Can't get through the procurement system
    - As a result will only sell to local
    - Need to standardize requirements
- The contractor does not consider those sent by the government to be experts in canine selection.
    - They are generally young, with limited experience, and on a temporary assignment.
    - Dog rejected by 341st for "he's not going to bite" became honor grad at special forces class
    - They do not possess the same level of expertise and continuing education as is possessed within industry.
    - Contractors claim subjectivity appears within the selection process
- The contractors interpret the process as wasteful, onerous, and inaccurate
    - Duplicative testing
    - Transportation of dogs to Lackland for testing wears the dogs out prior to selection testing.
        - Dogs are animals, not machines.
        - They have good days and bad days
    - Additional costs levied on the contractor to test dogs that they know will not be purchased.
        - Dogs that are rejected are not rejected for factual reasons but due to lack of funding.
            - Dogs are offered which meet other agencies requirements are rejected off-hand. (TSA)
            - Same dogs are then purchased by other DOD services (Delta, Socom, Marsoc, etc.)
            - Claim: To support determination that European buy-trips are required in spite of Buy American Act Lackland is purposefully not purchasing dogs from American vendors.
- Competitors

- “Billionaires” are buying up competitors in the TSA market space, and pulling people from TSA to run operations
- Claim: the rest of the big names in the space are “just as mad as the rest of us”

APPENDIX C. INTERIM REPORT

Interim Report

on a

Study of the Domestic Supply of Military Working Dogs

for

Air Force Installation Contracting Center

Prepared by:

Capt Jason Passarella & 1st Lt Robert Paulo Ocampo

TABLE OF CONTENTS

1. PURPOSE

The Department of Defense has faced a shortage of domestically bred military working dogs (MWDs) for over three decades. The lack of a robust domestic industrial base threatens the services ability to maintain readiness if supply from foreign markets is interrupted for an extended period.

This paper addresses language from the Government-wide Working Dog (GWD) Category Intelligence Report (CIR) and House Resolution 2810, which was passed into law as the Fiscal Year 2018 Defense Authorization Act (NDAA). The purpose of the CIR is to provide actionable business intelligence to identify more effective and efficient sourcing strategies for MWDs. The NDAA levies requirements upon the Department of Defense (DOD) to "work to ensure that military working dogs are procured as efficiently as possible and at the best value to the Government, while maintaining the necessary level of quality and encouraging increased domestic breeding" (NDAA, 2017).

As AFICC is the sponsor of this research and is currently the assigned working dog category manager, the data used for this paper was primarily sourced from those of the military working dog (MWD) program. To this end, this document describes the conditions impacting the domestic production and supply of Military Working Dogs (MWD). From this perspective emerges a list of potential implementation actions that harness Government Programs, both current and conceptual, with the potential of increasing the domestic supply of MWDs. As this report represents an interim assessment of the marketplace, further directed research with the intent of guiding current and future policy, funding, and strategy approaches that include all federal government working dog programs will be required.

2. BACKGROUND

History of "War Dogs" within the DOD

MWDs have been in use throughout history to accomplish a variety of missions. From their earliest mention in history, working dogs have provided vital support to their handlers. Ancient scripts detail the use of canines such as when Alyattes, king of Lydia (circa 600 B.C.), took the field against the Cimmerians and used a "number of large and fierce dogs" (Forster, 1941, p. 114) to fall upon the invaders, tearing many of them to pieces and putting others to flight.

During World War I, the United States Army employed an unofficial canine war force for use as messengers, early warning detection against incoming artillery or mustard gas, and for improving troop morale (Ainsworth, n.d.). However, despite the heavy use and contribution of canines in WWI, the U.S. military was still unprepared to utilize working dogs in combat roles when they entered World War II in 1941 (Frost, 1990, p. 14). Throughout the next conflicts, regardless of indications that using dogs significantly decreased patrol casualties, the U.S. military has continued to be inconsistent in its execution of working dog programs, has drastically reduced its inventory levels, and has

diffused its internal expertise following each major conflict over the last century (Frost, 1990, p. 17). Sheila Goffe, vice president of government relations for the AKC, stated in her testimony supporting the Domestic Explosives Detection Canine Capacity Building Act of 2017, "Since the terrorist attacks on 9/11, and subsequent attacks worldwide, global demand for high-quality, explosives-detection dogs has skyrocketed" (Leigh, 2018).

Relevance of the MWD in a Technologically Advanced Battlespace

The surge in terrorist activities worldwide has steadily increased the demand for working dogs (Battaglia, 2017, p. 178). As acts of terrorism such as bombings and mass shootings in schools, train stations, and other public places rise, these canines are now required to perform a much more sophisticated and specialized set of tasks than they ever did before (Leigh, 2018). They perform multiple tasks from conducting patrols, detecting explosives and drugs, and tracking enemy combatants, that could not be easily matched or replicated. According to Major Matthew Kowalski, commander of 341st Training Squadron at Joint Base San Antonio in Lackland, Texas, "A lot of our science and technology for years has been trying to replicate the work these dogs do. Their olfactory glands are 10,000 times more sensitive than any piece of equipment we've been able to develop. So, the detection work they do, a dog finding explosives or drugs, that's never going to be replaced." (Willingham, 2019)

Army Colonel David Rolfe, a previous director of the Defense Department's Military Working Dog Program, in regard to efforts to produce an artificial nose remarked, "Some people say it could be 50 years before we'll have an artificial nose that can replace a dog." (Miles, 2012) He continued, "A machine doesn't care if it finds something, but a dog wants to please its handler. A dog will go looking for something on its own where a machine won't." He comments that the key differentiator between dogs and any other potential replacement is that, "dogs have a heart—something that makes them an invaluable asset to our fighting forces."

U.S. **Government Efforts**

Over the past several decades, various agencies within the U.S. federal government, such as the Transportation Security Administration (TSA), Customs and Border Protection, U.S. Customs Service, and the U.S. Army, have initiated independent breeding programs (Leighton et al., 2018). In each of these cases, the breeding programs were either disbanded or dramatically reduced due to funding cuts (Battaglia, 2017; Leighton et al., 2018).

According to the GWD CIR (FCM, 2019), the DOD operates a small breeding program located at Lackland Air Force Base in San Antonio. The Air Force (AF) is the DOD Executive Agent for the MWD Program (DOD Directive 5200.31E, *DOD Military Working Dog (MWD) Program*). The Secretary of the AF has delegated these duties to Headquarters Air Force/Director of Security Forces (HAF/A4S). To manage the program, HAF/A4S has appointed a DOD MWD Program Manager (PM) who is assigned to HAF/A4SX. In addition to managing the program, the DOD MWD PM develops policy and

provides guidance to service component PMs, DOD Police Agencies, and the 341st Training Squadron (341 TRS). The 341 TRS acquires, evaluates, trains, accounts for, distributes/redistributes, and provides distribution instructions for all DOD MWDs (FCM, 2019).

The federal government currently maintains approximately 5,000 working dogs across four departments (DOD, DHS, DoJ, and DoS; FCM, 2019). However, only 7% of the total inventory across all U.S. government agencies are bred domestically, and the rest are imported from European markets (FCM, 2019). Despite the apparent shortage of working dogs in the United States and the declining supply from Europe, the federal government aims to grow its inventory by at least 20% in the next 3 years (FCM, 2019). Currently, the Air Force's DOD MWD Program at Lackland AFB provides enough Belgian Malinois puppies to accommodate approximately one-third of the DOD's yearly working dog requirement (Sanchez, 2012).

3. RESEARCH METHODOLOGY & RESULTS

Methodologies

In order to gain a better comprehension of the conditions impacting the domestic production and supply of military working dogs, we executed a three-step research approach. First, we conducted a thorough literature review of articles, historical data, policies, and regulations to provide a baseline of understanding of the factors contributing to the shortage of domestic military working dogs. Second, we interviewed organizations that we considered experts in the working dog industry. We chose to interview individuals from companies that have, have not, and those who have stopped conducting business with the government, educational institutions who are conducting research about working dogs, one of the largest canine organizations, and an expert from the government sector. We provided a handout (see Appendix C) containing the two major factors and five courses of action that we have developed. These were provided to help guide the interviews with the experts in the industry. Finally, we analyzed the data collected and identified common factors impacting the domestic production and supply of military working dogs.

Results

For a description of the phases used throughout this paper please reference Appendix A.

Our research suggests that there are two major factors contributing to the shortage of domestic military working dogs: the economics of importation and the challenges of doing business with the DOD.

Factor 1: Economics of Importation – Importing MWD candidates appears to be a more viable business option for vendors than breeding domestically.

a. Lower Cost. According to several of the industry experts which we interviewed; domestic **v**endors are more likely to import MWD candidates than breed them domestically due to the lower average cost of an imported dog. Additionally, retailing (buying and reselling) allows vendors focused on importing to incur fewer holding costs in terms of facilities, inventories, employee wages, costs of training, etc. The MWD supply chain/process was analyzed for both vendors who breed domestically (Diagram 1) and those who import MWD candidates (Diagram 1). A vendor who focuses on importing does not have to directly account for the costs incurred in phases 1 through 3 of the MWD product life cycle.

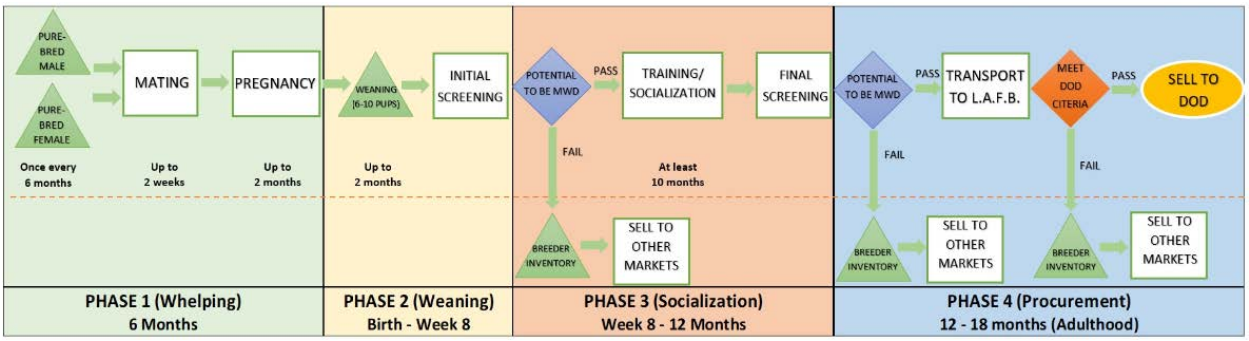


Diagram 1. Process Flow Chart of Domestically Bred Dogs. The full product life cycle process from breeding, whelping, weening, socialization, and sale is represented. Depending on the level of training required by the government, it can take an average of 18 months to produce a quality dog that is prepared to meet DOD selection criteria. Description of the phases is contained within Attachment A.

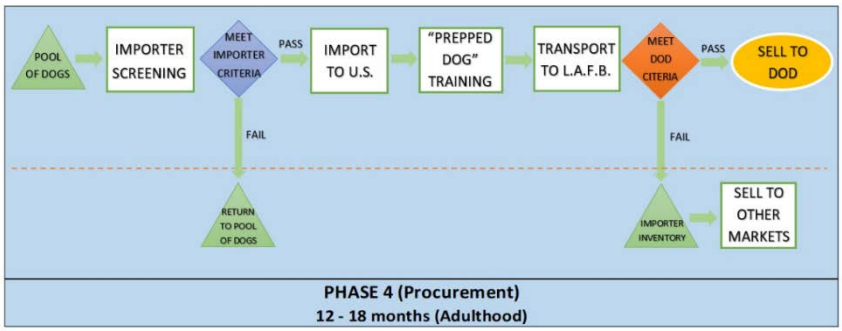


Diagram 2. Process Flow Chart of Imported Dogs. Those vendors who primarily import MWD candidates described their process of providing MWD candidates for selection within a 30-day timeline. A vendor who focuses on importing does not have to directly account for the costs incurred in phases 1 through 3 of the MWD product life cycle.

b. Better yield for imported dogs. Imported dogs tend to have higher success rates in terms of selection and purchase by the government for training as military working dogs. This is due in part to foreign-bred dogs coming from a more proven pedigree and generally more established breeding programs.

Culture – Of those interviewed there is general agreement that the most significant difference between the American and European markets for working dogs is the influence of working dog culture in the raising of animals. Within the European market there is a prevalent culture of dog clubs, high level working dog competitions, and a constant socialization and training of working dogs in diverse environments.

These cultural influences are not present within the American market for working dogs. This organic approach to raising and training working dogs, which is embedded in the European working dog culture, enables a lower cost production of working dog candidates than is possible in the American market. A prominent MWD importer, who has conducted business with the government for more than 10 years, related that since dogs purchased from the European market have already received significant socialization and training (Phase 3) less resources are required to train them from a "green" dog to a "prepped" dog.

Genetics – Dr. Cynthia M. Otto, founder and executive director of the Penn Vet Working Dog Center, remarked that, "The primary difference between the domestic supply of dogs and those procured in Europe is that the European-bred and -trained working lines have a proven history of pedigrees from dogs selected for working traits. These traits are defined by the influence of competitive dog sports and the training requirements needed to participate at regional and national events" (Green, 2017).

Dr. Otto further stated that the use of genetic phenotyping in dog breeding can lead to a higher likelihood of positive health outcomes such as increased longevity and lower occurrence of negative outcomes, such as disease or physical impairments. Breeding guided by the use of genetics, along with a robust training protocol, may lead to a higher likelihood of positive personality traits, such as increased drive or desire. Understanding these traits, both physical and behavioral, can lead to focusing resources upon dogs which will have the highest likelihood of successful careers.

Factor 2: Challenges of doing business with the Department of Defense – Selling military working dogs to the DOD may not be the most advantageous business option for domestic breeders. Breeders have more lucrative options in terms of training and selling their dogs to other market segments. Other markets segments for dogs, such as show dogs, sports dogs, companion dogs, etc., generally have less barriers to entry, fewer regulations, and less stringent requirements than those of the DOD.

a. Decreased Revenues: Within the dog industry the market for **s**elling MWD candidates to the DOD yields lower revenues for breeders and vendors than could be realized in other market segments. Per the CIR the FY18 average price for a pre-trained MWD purchased from a domestic vendor was $12,815.90 (FCM, 2019). Whereas the price of a pre-trained service dog starts at approximately $15,000 and can range to over $30,000 (NSARCO, 2019). Additionally, it has been reported that other government agencies have paid higher prices (realize greater margins) than the DOD. Furthermore, other market segments (non-DOD or government) may only require a weened puppy versus a fully trained "prepped" working dog. Breeders are able to sell a younger puppy without incurring the costs of maintaining a dog until it meets the age requirements for sale to the DOD.

b. Shifting non-standard requirements: There are numerous government agencies from federal to state and local which each have their own requirements for working dogs. This variability is difficult for breeders to anticipate as different customers may require different training protocols to meet selection. In prepared testimony given to two U.S. House of Representatives subcommittees, Sheila Goffe, the Vice President for Government Relations with the AKC stated, "…there is a disconnect between the government and breeders or vendors in understanding the requirements or standards that define an acceptable green dog" (Goffe, 2017). Ms. Goffe added,

> Vendors, breeders, and government employees have expressed concerns about vague standards and inconsistent interpretations of requirements in published scopes of work for green dogs. They note this is particularly problematic for "subjective" portions of a dog's evaluation, where evaluators may have significant leeway in judging factors, such as environmental stability, sociability, or drive/hunting ability. Such inconsistency creates frustration and confusion about standards sought for dogs entering MWD programs. … One vendor expressed concern about a lack of transparency and substantive feedback by evaluators when dogs had been rejected with little explanation. (p. 9)

This testimony is consistent with statements made by our interviewees.

c. Lack of Experience: The assignment-based nature of staffing for those selecting MWDs for purchase by the DOD limits the level of expertise, training, and knowledge available for making selection decisions. This lack of experience has led to dogs being passed over for selection, which would otherwise meet the standard if evaluated by a more experienced government evaluator. A vendor with a careers worth of experience working with the DoDs MWD program as a military member reported that this has caused significant issues in regard to their ability to sell dogs which meet requirements, as inexperience can lead to greater levels of subjectivity within the selection process.

d. Onerous Procurement Process: Breeders face numerous challenges when seeking to do business with the government. The requirements associated with doing business with customers other than the U.S. Government are much more streamlined and easier to navigate. This difference causes vendors to seek out the highest yield market with the least barriers to entry. For example, a vendor can sell a dog trained in patrol work, detection, and hard surface tracking to police departments or state agencies for between $12,000.00 and $15,000.00 (NPDF, 2020). This is equivalent to the average price paid by the DOD for a fully trained working dog without the hassle of working with the DOD. This has been corroborated through our research as multiple vendors have described that they are pursuing other market segments based upon their frustration with the DOD procurement process.

e. Uncertain Demand Forecasts: Without clear knowledge of government demand, breeders and vendors assume great risk when choosing to breed or acquire stock to offer the government. The variability of government funding increases the uncertainty inherent with the governments demand for MWDs. This inhibits the domestic marketplace from utilizing forecasting in growing their supply. A vendor remarked that they are required to present double to triple the number of dogs to the government than what the government will ultimately purchase. This leads to significant costs which the contractors will need to absorb.

4. FOCUS AREAS AND POTENTIAL IMPLEMENTATION ACTIONS

Based upon the results of our research, we determined that there are three major general focus areas which could yield significant growth in the domestic supply of MWDs available to the U.S. Government.

AREA 1: Invest in the domestic breeding industry.
Our research revealed, as illustrated in Diagram 1 and 2 above, that the production cost of breeding dogs in the United States is significantly more expensive than the transactional cost of importing "ready-to-purchase" MWDs from European countries.

AREA 2: Influence domestic breeders and vendors to supply to the DOD. Research conducted by the American Kennel Club suggests that the U.S. has a large number of breeders that have the resources and the know how to breed and train dogs. However, a significant portion of the domestically bred MWD candidates could not pass the strict requirements of selection. Research institutions and private organizations claim that the main difference between U.S. and EU dogs are genetics and culture/socialization.

AREA 3: Revitalize the procurement process. It is no surprise that the government procurement process makes it difficult for contractors, both importers and domestic breeders, to conduct business with the government. The high level of difficulty inherent in doing business with the government is a significant barrier to maintaining a steady supply of MWDs entering service with the DOD.

Below we have included a listing of the implementation actions which could be taken to improve domestic supply of MWDs. They are not presented in any order of importance or level of impact. Each action is organized with a description of the action, details of the possible impacts of implementation, and a reference to the focus area or areas which the action could influence. Each potential implementation action has been considered individually and independently of the others. The implementation actions included in this section are those which we believe are the most feasible. Additional options, which were not explored in depth, are included in Attachment B.

Potential Implementation Actions:

1. Encourage small breeding operations or vendors to establish collaboratives or cooperatives to pool resources and save costs. These collaboratives/co-ops would enable small operations to control costs and lower prices to become competitive with larger, more established competitors.

   If we influence these smaller breeders or vendors to work together, they will be better positioned to overcome the barriers to entry within the DOD market space. This will increase overall supply available within to the DOD.

   Focus Area(s): Influence

2. Establish regional selection locations throughout the U.S. to reduce transportation costs to vendors presenting MWD candidates for selection. These selection locations can be placed in such a way as to minimize costs to vendors while maximizing coverage for the government.

   The implementation of these selection locations will decrease costs for vendors and reduce barriers to entry for smaller firms who are unable to absorb the costs of transporting candidates' long distances for selection.

   Focus Area(s): Invest, Revitalize

3. During phase 3 of the MWD product life cycle, a key component to successful MWD candidates is the level of socialization which they receive. Many small breeding operations do not have access to the necessary facilities required to properly socialize their MWD candidates. To promote greater levels of quality socialization training among breeders, vendors, and trainers the government may offer to provide access to facilities such as mock disaster recovery sites, firing ranges, derelict buildings, etc.

   With access to these types of facilities, breeders and vendors will be able to offer MWD candidates which are better prepared to meet selection criteria. Having a higher overall selection rate will increase vendors margins as well as improve the quality of MWDs purchased by the DOD.

Focus Area(s): Invest, Influence

4. The DOD can create a consortium by partnering with other Federal Government agencies to consolidate, procure, and manage the requirements for military working dogs. As there are many sectors in the government that require MWDs, these diverse organizations often compete amongst each other for the limited supply available within the marketplace. In general, these organizations require the same physical and behavioral traits when procuring their MWDs. This consortium would be positioned to standardize the requirements for various categories of MWDs and the evaluation criteria utilized in selection.

   By having one organization managing and advertising all the working dog requirements, breeders and vendors will be encouraged to increase the scale of their operations and improve the quality of their dogs. This will also eliminate some of the most discouraging factors for breeders, such as inconsistencies and subjectivities during the selection process.

   Focus Area(s): Revitalize

5. The lack of long-term procurement relationships between government and industry in this market sector hinders industry's desire to make long term investments into breeding versus importing. The government could gain significant benefits by establishing MAC ID/IQs with a host of state side breeders and vendors. These contractual relationships, which could contain minimum purchase requirements from each vendor, would signal to the vendors that there is significant and consistent long-term demand from the government.

   The presence of these relationships would provide to the vendor base the ability to better forecast government demand, which could encourage them to adjust their business models to focus on domestic breeding to meet that demand.

   Focus Area(s): Influence, Revitalize

6. Change the staffing of positions for government representatives working with MWDs. Presently, not all military branches have a specific career field centered on training, working with, and caring for MWDs. This should be standardized to improve long term expertise and institutional knowledge within the services. Additionally, the practice of short term (average of 3 years) assignments for military members working with MWDs should be adjusted to a longer time frame.

   Implementing these changes will improve the experience and knowledge of those assigned to make evaluation and selection decisions. Additionally, retaining competent and highly qualified individuals within the MWD community will increase the retention of institutional knowledge and provide for greater levels of continuous process improvement.

Focus Area(s): Revitalize

7. The DOD should move to discontinue the practice of procuring dogs directly from the European marketplace in lieu of relying fully upon the domestic breeder/ vendor base. The continuous use of "European Buy trips" to procure dogs from the European market discourages domestic breeders and vendors from participating fully in the DOD market segment. Recent buy trips have yielded around 100 dogs per trip. These trips generally result in a reduced costs per dog to the DOD, but consequently the domestic marketplace is unable to compete at these reduced prices. Many breeders or vendors would be operating at or near a loss to compete with the prices from the European market.

   Implementation of this action would show the domestic marketplace that the DOD is willing to pay a fair and reasonable price to domestic vendors for a quality product. Sending this message would encourage vendors to make investment in producing or supplying MWD candidates to the DOD.

   Focus Area(s): Invest, Influence, Revitalize

8. The DOD should lobby for the creation of a new NAICS code for MWDs. At present the "live animals" NAICS (112990/ PSC 8820) is utilized for the procurement of MWDs. The threshold for a small business under this NAICS is $750,000.00. This causes successful breeders and vendors to quickly "size out" of the small business competition.

   Making this change will allow more breeders and vendors to compete under the existing small business set-asides, which will increase supply available to the DOD.

   Focus Area(s): Revitalize

5. CONCLUSION AND RECOMMENDATIONS

The economics of importation and the challenges of doing business with the DOD are key factors affecting the domestic production and supply of military working dogs. Although some of the subfactors identified may be considered miniscule, the "compounding effect" of these factors discourages domestic breeders from providing MWDs to the government. Additionally, the current methods utilized to procure military working dogs have the effect of forcing providers to offer MWD candidates, which are imported from the European marketplace under short timelines and at lower prices than is feasible to be provided from the domestic marketplace. We have identified general focus areas which can be pursued through potential implementation actions to improve domestic supply of MWDs. We recommend AFICC to select several of the potential implementation actions for further research to gain a better understanding of the measurable impacts of pursuing these steps.

ATTACHMENT A – Additional Information

Additional information on the MWD product life cycle:
The following phases were derived from the typical stages of growth and development of canines and incorporated with the acquisition milestones that take place within the procurement and selection process for working dogs.

PHASE 1 (Whelping): This phase starts with the selection of the male and female dogs that have the right pedigree and history of successful working dogs. It is important to know and understand the female dog's reproductive cycle in order to plan the breeding process.

PHASE 2 (Weaning): This phase is typically not separated from Phase 1; however, the success rate may be affected by specific courses of action if applied during this phase. During Phase 2, the litter undergoes dependent stage, transitional stage, learning life skills, and goes through initial training and socialization.

PHASE 3 (Socialization): During this phase, the pup goes through the fear period, energy and chewing, and will start testing boundaries. Most of the character traits that the Department of Defense is looking for, will be developed during Phase 2.

PHASE 4 (Procurement): This is the phase when the dogs become eligible for government procurement. The minimum age requirement for working dogs is 12 months. The dogs are still at the optimum level of trainability up to 18 months (when they reach adulthood).

ATTACHMENT B – Additional Implementation Options

1. The Federal Government can create a program/consortium by partnering with other government agencies (SBA, state, etc.) and non-profit organizations to absorb or subsidize some or all of the costs necessary for a business to start a breeding program. These subsidies may be in a form of low interest rate loans, free or low-cost real property, breeding stock/pups, training programs, etc.

   Due to the high production costs of domestically bred MWDs, reducing the out of pocket cost of breeding may help encourage dog breeders to start doing business with the government. The only catch that this program will have for participants is that the government will have priority on purchasing the qualified working dogs.

2. Incrementally restrict the importation of MWDs. To reduce supply chain impacts this restriction would need to be implemented in a phased approach over the course of 5–10 years. (Ex. Year 1 – 10% domestically bred, Year 2 – 30% domestically bred, and so on).

   While this approach is extreme, it may encourage vendors to transition their operations to focus on breeding their own dogs or partner with domestic breeders to provide domestically bred MWD candidates to the government.

3. The government can invest in research and development of MWD capabilities by partnering with research institutions such as Auburn University College of Veterinary Medicine (AU Vet Med) and University of Pennsylvania School of Veterinary Medicine (PennVet).

   Partnering with organizations which are already actively pursuing R&D efforts in these fields can help to reduce government costs while yielding valuable information in shaping the future of the MWD.

4. The military working dog is one of the few living and breathing weapon system that the DOD uses. Due to the unique characteristics, timeline, and complexity of producing a qualified living animal, it may be possible to create a new regulation or procurement procedure to make the acquisition of dogs more efficient. It could become one of the exceptions or addendums to FAR Part 12 – Acquisition of Commercial Items.

   Designing a regulation that is specifically developed for the purpose of procuring a living animal would eliminate unnecessary or irrelevant clauses and restrictions that would have not applied to the procurement of animals in the first place. By having a specialized procurement process this can drastically increase the speed and flexibility of procurement. This can reduce the barriers to entry for small breeding operations, which are not equipped to handle the full-scale government procurement process.

5. The current process of acquiring MWD candidates is completed via an assortment of BPAs. These BPAs require delivery within 30 days of a call. This process incentivizes vendors to provide dogs which they can acquire and offer to the government within this 30-day timeline. A longer timeline is required for breeders to be able to effectively provide dogs based upon their process timeline.

   A longer available timeline will allow breeders the opportunity to breed domestically to meet the government's requirement. Vendors who generally rely upon importation to meet the requirement will then also be able to turn to the domestic market for resale of dogs.

6. The government should conduct a marketing campaign among breeding associations throughout the U.S. to publicize the importance of MWDs to national defense and security operations. This could be conducted through presentations, TV commercials, or visits to dog shows.

   This campaign would improve market visibility into the governments need and requirement for domestically bred MWD candidates.

7. The government can provide free or low-cost training classes to assist breeders and vendors in understanding and training to the selection requirements.

   These classes will provide the opportunity for knowledge to be shared between government and industry to improve best practices. Breeders and vendors will also be able to gain a better understanding of the selection requirements and criteria that evaluators will be using for selection. This will enable them to better align their training programs to meet the government's needs.

9. The government can partner with the organizations such as the American Kennel Club to form MWD clubs throughout the U.S. These clubs will be focused on increasing the cultural awareness of the population on the role and importance of MWDs to U.S. national security.

   These clubs can help to replicate the cultural practices surrounding dog ownership, which is prevalent in Europe. Specifically, these clubs can be the avenue through which dogs can be exposed to stressful situations and locations, such as crowded train terminals, airports, busy city streets, etc.

10. The government may provide pre-selection screening services to breeders or vendors. These services will be offered for dogs in the training/socialization phase (phase 3) prior to selection. The screenings will look to identify physical, medical, or behavioral issues that may disqualify the dog from selection as an MWD.

If a breeder or vendor is advised early in the training process that their candidate will have a low probability of being selected, they are able to focus time, effort, and resources on other candidates with a higher likelihood of selection.

ATTACHMENT C – Interview Handout

Research into Conditions Impacting the Domestic Production and Supply of Military Working Dogs

Objective

The objective of this discussion is (1) to gather insight from industry experts on supply conditions in the domestic market for military working dogs and (2) to discuss potential strategies that might be used toward improving supply.

Background

The Department of Defense is facing a chronic shortage of domestically bred military working dogs that has persisted for decades. Of the dogs within the current workforce, approximately 90% were bred overseas. The inventory of military working dogs is primarily comprised of four breeds: German Shepherd, Belgian Malinois, Dutch Shepherd, and Labrador Retriever.

Nature of Research

This interview is being conducted by two U.S. Air Force contracting officers in the course of their M.B.A. program (thesis research) at the Naval Postgraduate School. The research has been requested by the U.S. Air Force. We are also happy to share the results of research with you once the study is completed.

This topic is exceptionally important and we appreciate your support and participation of our research.

Big Question #1
What are the most important factors impacting the domestic production and supply of military working dogs?

Our initial research suggests that there are two major factors contributing to the shortage of domestic military working dogs. We would like to obtain greater insight to these factors and identify any others that may be impactful.

1. **Importing military working dog candidates appears to be a more viable business option than breeding domestically.**

    a. *Lower costs for imported dogs.* Vendors are more likely to import than breed domestically due to the lower average cost of an imported dog in conjunction with the increased liquidity from retailing (buying and reselling) allows companies to incur fewer costs in terms of facilities, inventories, employee wages, costs of training, etc.

    b. *Better yield for imported dogs.* Imported dogs tend to have higher success rates in terms of selection and purchase by the government for training as military working dogs. This is due in part to foreign-bred dogs coming from a more proven pedigree and generally more established breeding programs.

2. **Selling military working dogs to the U.S. Government may not the most advantageous business option for domestic breeders.**

    a. *Competition for domestic dogs.* Compared to sales to the government sector, there are more lucrative and viable market sectors such as sports/show dogs, service dogs, etc. These options generally have less barriers to entry, fewer regulations, and less stringent requirements than those of the Government sector.

Big Question #2

What steps could stakeholders such as the U.S. Government, industry associations, and breeders take to improve these factors?

Our initial research suggests that several steps have been proposed to address this longstanding issue. While five are listed below, we recognize that several of these may not truly be viable and that other potential solutions may be missing from this list.

1. **Restrict U.S. Government purchases to only domestically bred dogs.**

   Require vendors supplying military working dog to the government to only offer dogs bred and whelped within the United States.

2. **Establish a government-subsidized dog breeding program.**

   Establish a partnership with top industry breeders and organizations to develop a sustainable breeding program that will support the government's military working dog requirements.

3. **Establish a cooperative training program to increase the quality of domestically bred dogs.**

   Create a public/private organization which will offer breeding, whelping, and training guidance to domestic breeders to improve the quantity and quality of dogs produced domestically for working dog roles.

4. **Improve government procurement process for obtaining military working dogs.**

   Overhaul governmental contracts for procuring military workings dogs by establishing a single government-wide contract, improving incentives for domestic breeders, refining requirements, and increasing flexibility in delivery time frames.

5. **Partner with research institutions to explore scientific solutions.**

   Provide grants to research institutions to explore meeting the working dog capability requirements through alternative breeds, the application of advanced genetics, or the improvement of training methodology.

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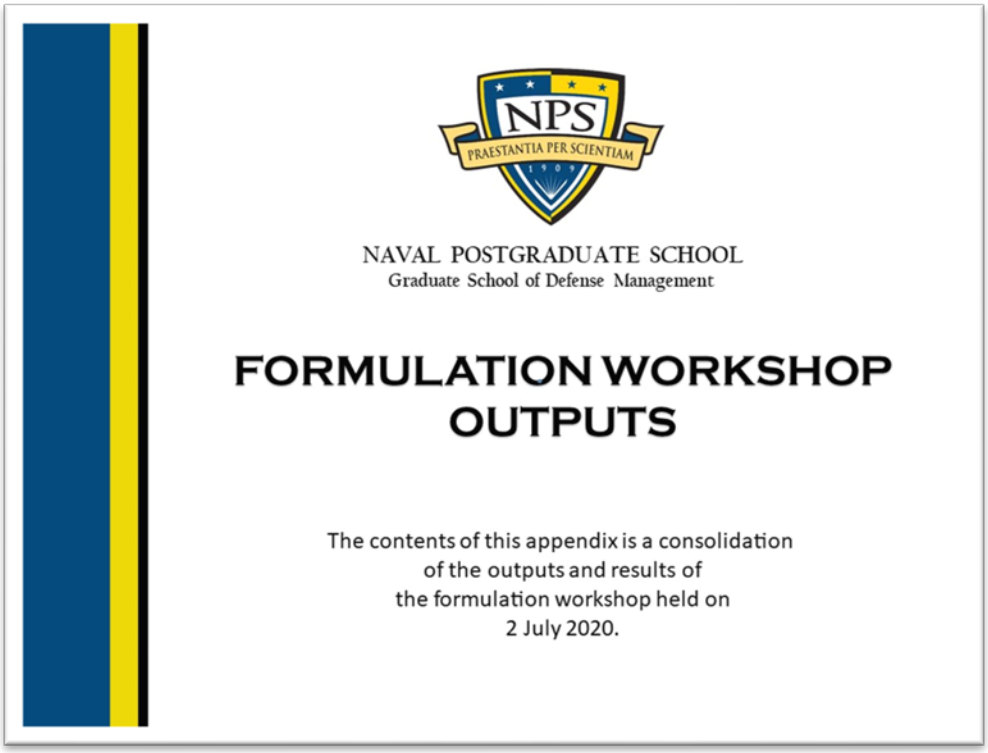
APPENDIX D. FORMULATION WORKSHOP OUTPUTS

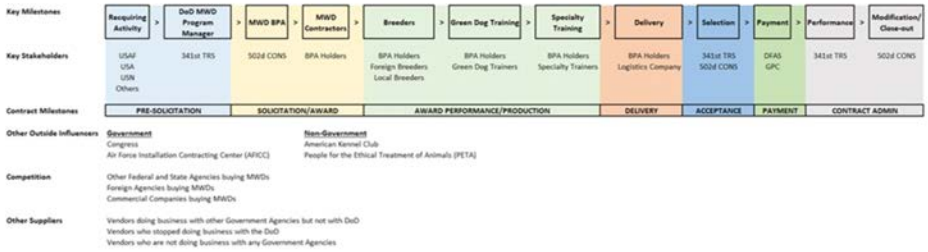


WORKSHOP CHARTER

Primary Goal	Deliverable	Timeline
Identify marketing activities for the Department of Defense Military Working Dog Program. The marketing activities will include estimated implementation time frames. The SBCP intends to address the following: Public awareness of the DoDs MWD Program, Increase MWD vendor base for the DoD, Increase participation of SB in the DoD MWD Program, and Encourage increased domestic breeding of MWDs	Small Business Communication Plan	July 2020

Sub-Goals	Deliverable	Timeline
Process Analysis: Breakdown the activities performed throughout the life cycle of MWDs.	Process Map	7 July 2020
Stakeholder Analysis: Identify the stakeholders and what bin they fall under within the procurement process of MWD	Robust Process Map	7 July 2020
Identify Stakeholder Issues	Charts	7 July 2020
Identify Potential Solution to Issues	Charts	7 July 2020

Process Map



Supplier Features

Features of Suppliers	Willing to sell to DoD		Willing to sell to other Fed. Depts	Dimension
Geography, Proximity, Distance	+	**4**	~	A/I
Purpose (Tool/Family)	+	**1**	+	I
Dog Breed	+	**5**	+	A/I
Capability – Training/Socialization	-	**6**	+	A
Capability – Breed Genetics/Quality	+	**7**	+	A
Need for Certainty	+	**2**	+	I/A
Size/Capacity (Funding, land, time, HR, arrangement)	-	**3**	~	A

SUPPLIER MECHANISMS/INFLUENCE

		Mechanisms
1	Purpose (Tool/Family)	Culture, philosophical disagreement, misinformation about MWD care/lifestyle, patriotism, gov't -> industry revolving door
2	Need for Certainty	Roi, loyalty, terms of commitment, lack of forecast of demand
3	Size/Capacity (Funding, land, time, HR, arrangement)	Funding, price, land, equipment, time, HR, contract arrangement (Play as they are, be a vegan)
4	Geography, Proximity, Distance	Cost of transportation, price, buy American, information network, evaluation resources are limited, impacts to dog selection rate (fatigue)
5	Dog Breed	Experience, price, relationships
6	Capability – Training/Socialization	Costs to raise/train up to maturity, experience
7	Capability – Breed Genetics/Quality	Pedigree, traits, cost, performance

SUPPLIER MECHANISMS/INFLUENCE

	Areas of Influence	Drivers
1	Purpose (Tool/Family)	· Culture · Philosophical disagreement · Misinformation about MWD care/lifestyle · Patriotism · Government -> industry revolving door
2	Need for Certainty	· Return on Investment · Loyalty · Terms of commitment · Lack of forecasted demand
3	Production Capacity	· Funding · Price · Land & equipment · Time · Human Resources · Contract arrangement
4	Geography, Proximity, Distance	· Cost of transportation · Price · Buy American Act · Information network · Evaluation resources are limited · Impacts to dog selection rate (fatigue)
5	Dog Breed	· Pedigree & traits · Performance · Potential profit
6	Capability	· Costs to raise/train to maturity · Experience · Relationships

Possible Solutions

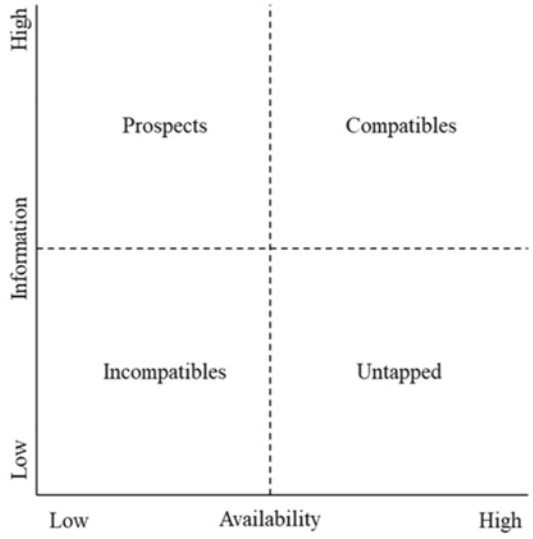
	Factors Driving Issues	Solutions	Possible Product(s)
1	Purpose (Tool/Family)	Improve the markets view of DoD MWD usage by using different media (videos, success stories, editorials, etc.) to capture more "family" focused producers.	Government working dog website. News articles and interviews.
2	Need for Certainty	Change contract structure to support more established government/contractor relationships. (Move away from BPAs)	Government-wide IDIQ or other improved contract structure.
3	Size/Capacity (Funding, land, time, HR)	Provide means such as financing, prompt payment, and use of facilities to enable vendors to increase capacity.	No-cost lease agreements.
4	Geography, Proximity, Distance	Create geographically dispersed selection sites across America to reduce transactional costs related to transportation and MWD fatigue.	Additional selection sites.
5	Dog Breed	Persuade vendors to offer the breeds that are suitable for MWD use by highlighting the benefits of participation in the DoD MWD program.	Marketing plan.
6	Capability – Training/Socialization	Provide education and training to inexperienced trainers, vendors, or breeders along with access to training facilities for enhanced MWD socialization.	Government and industry co-sponsored training.
7	Capability – Breed Genetics/Quality	Assist vendors in acquiring breeding stock with quality pedigree through financial assistance or allow vendor access to breed with dogs from the DoDs breeding program.	GWD Breeding Program.

Attribute Map

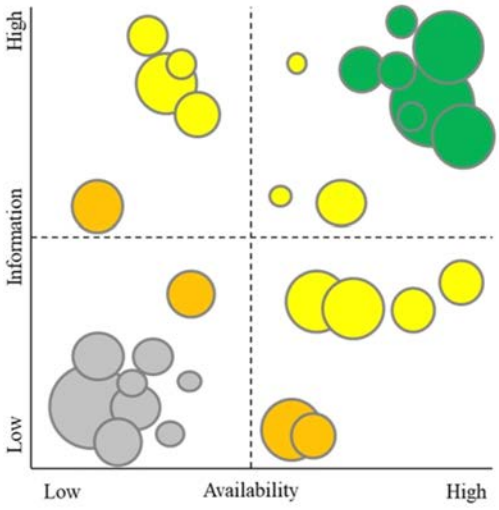
Values	Motivators	Exciters
Love of Dogs	Money	Patriotism
National Security	Good forecast	Domestic Ind Base
-"the troops"	Growth	Kudos
	Loyalty	Guaranteed Business

Tolerables	De-motivators	Killers
CICA	Procurement system	Philosophically against MWD
Strict Requirements	Misinformation	Selection Process
-MWD breeds	ROI/Margins	-Inconsistency
-Quality of dog	Bad Logistics	-Rel. Inexperience
	Contract Terms	

SUPPLIER MARKET SEGMENTATION



DRAFT SEGMENTATION DESCRIPTION



Informed – A measure of how informed the vendor is regarding the use, treatment, and retirement of MWDs as well as the procurement process utilized to obtain MWDs.

Availability – Comprises willingness, capability, and capacity of the market segment to meet DoD requirements for MWDs.

Color – Green represents those vendors who are optimal/advantageous positioned. Yellow represents those who can be moved using a marketing strategy into a better position. Orange vendors can be moved but will require greater effort than yellow vendors. Gray represents vendors who have a low likelihood of movement.

Size – The size of the circles are a relative valuation of the firm's yearly revenue. Larger circles equal larger yearly revenues.

Strategy – The techniques or tactics used to move vendors of the market from one quadrant to another (Denoted by arrows on the grid).

PROOF OF CONCEPT

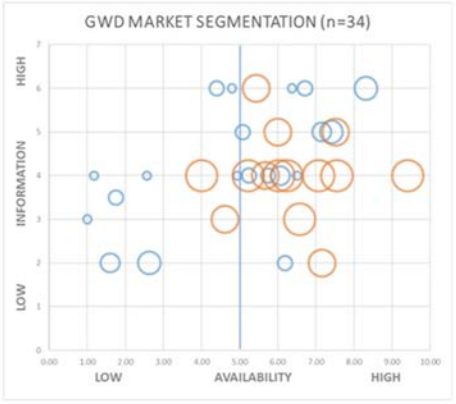
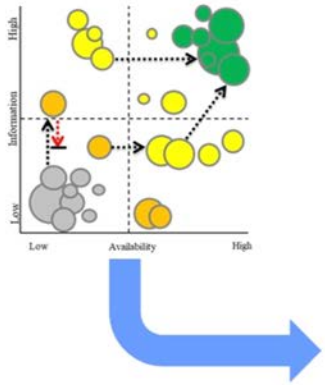


Figure 2: Market Segmentation based upon RFI data set

	Business Size		n=34
Segmentation	Large	Small	Total
Compatible	9	10	19
Incompatible	2	3	5
Prospect	0	6	6
Untapped	1	2	3
On the Cusp	0	1	1

Table 1: Market Segmentation by Business Size

MARKETING ACTIVITY VISUALIZATION



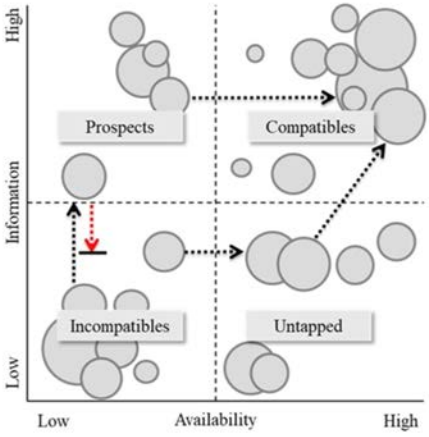
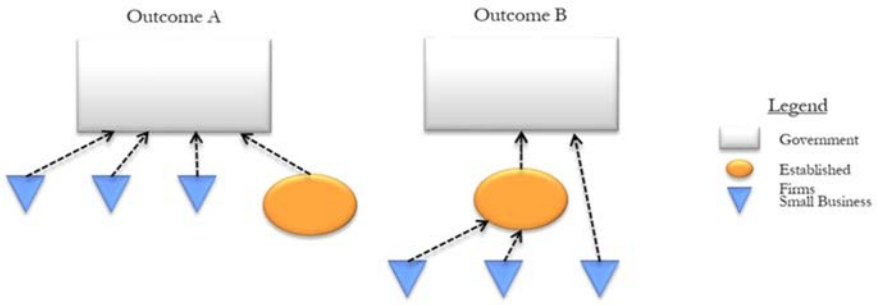


Figure 3: Marketing Activities Illustrative Strategic Implementation

Outcome Scenarios



Graphic 1: Potential Outcome Scenarios

Marketing Activities

Marketing Activity	Description
Print/Digital Media	• GWD Program representatives and GWD Marketing Team Members should participate regularly in interviews for news organizations, industry magazines or periodicals, websites, and other news sources. • To facilitate a centralized repository of standardized information across all departments a single "one-stop-shop" website should be deployed and maintained.
Attendance at Industry Events	• Representatives from the GWD Program as well as the GWD Marketing Team should regularly attend industry events such as conferences sponsored by AKC, trade shows organized by specific breeding clubs, and webinars led by various canine organizations to raise awareness and improve relationships with the working dog industry. • The GWD Team should team up with industry associations such as the AKC to lead events like the detector and patrol dog competition.
Tools and Resources	• Tools should be made available through the proposed GWD Program website which covers the acquisition process for working dogs, information for firms on becoming registered to do business with the government. • Resources, such as monetary assistance and expertise, should be made available in several forms to interested firms.
Consistency of Message	• To be able to ensure consistency of message and synergy of effort the execution of the activities described above should be planned, coordinated, and conducted to address a government-wide marketing approach.

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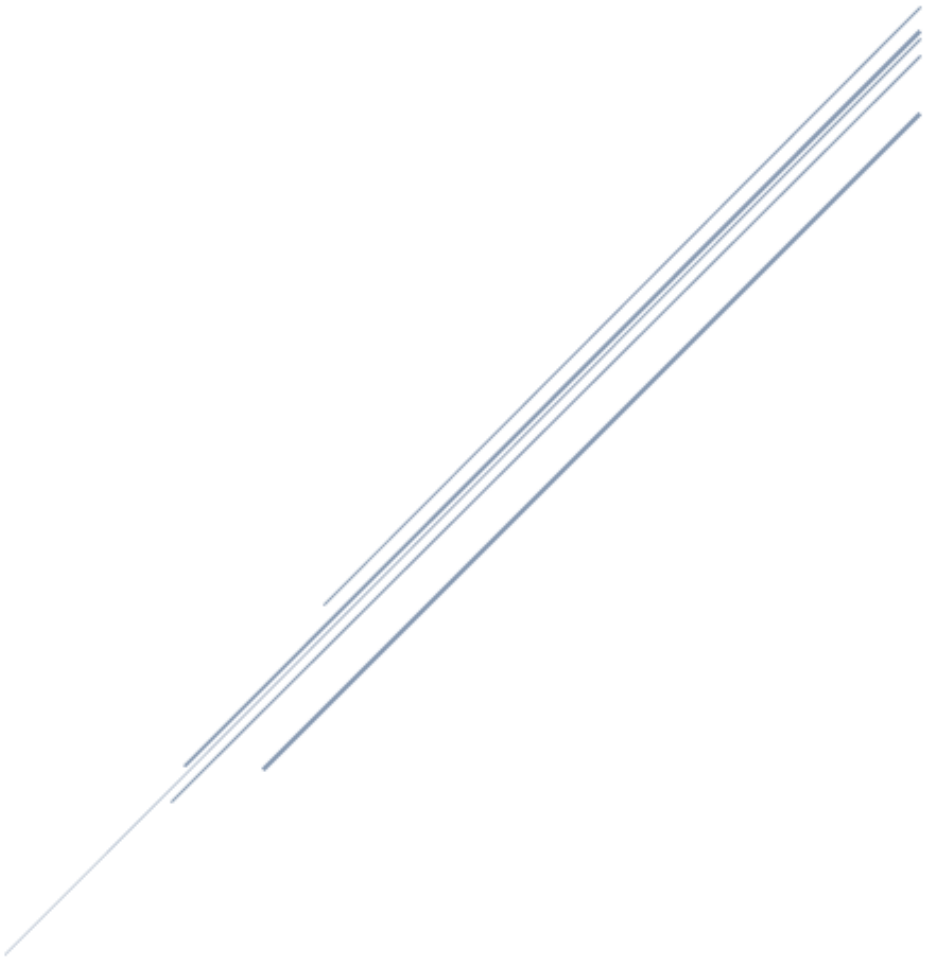
APPENDIX E. GOVERNMENT-WIDE WORKING DOD SMALL BUSINESS COMMUNICATION PLAN

GOVERNMENT-WIDE WORKING DOG PROGRAM

Small Business Communication Plan



GWD Category Management Team
26 July 2020

Document History			
Version	Comments	Date	Author(s)
0.2	Expanded agencies under 2.1, adjusted market segmentation calculation	2020-07-26	Jason.passarella@nps.edu, robertpaulo.ocampo@nps.edu
0.1	Initial draft for coordination	2020-07-15	Jason.passarella@nps.edu, robertpaulo.ocampo@nps.edu

1.0 Primary Audience

The Government-wide Working Dog Program Small Business Communication Plan (GWD SBCP) is intended for use by the Subcategory 3.1 Security Animals (Working Dogs) Category Management team to guide the execution of industry outreach and marketing activities to promote increased participation by domestic breeders in the patrol/detection (Military Working Dog) industry. As the Subcategory 3.1 team has responsibility for all United States (US) federal government Working Dogs this plan seeks to align the efforts of the various stakeholders across the federal government and industry.

1.1 Primary Objectives

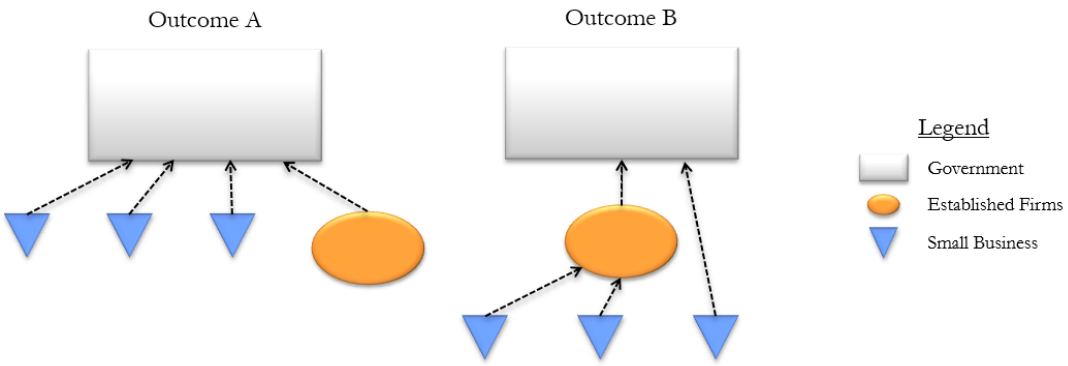
The GWD SBCP describes overall marketing activities for the government-wide working dog program. The primary objectives of the GWD SBCP are as follows:

1. Increase small business awareness and participation in GWD programs
2. Improve relationships between government and industry
3. Provide tools and resources to industry to facilitate greater participation in federal working dog programs
4. Create reliable and consistent messaging for the GWD program that reflects the realistic expectations and experiences of public and private stakeholders

Although a key intent of this plan is to increase awareness and participation of small businesses, the marketing activities described can also positively influence large businesses within the industry.

1.2 Potential Outcomes

It is important to note that two major outcomes are possible given the approach outlined within this plan. These potential outcomes are shown below in Graphic 1. Outcome A shows that new small business entrants to the market will predominantly do business directly with the government whereas Outcome B, which based on findings has a higher likelihood of occurrence, shows that the majority of new entrants will align themselves under more established firms. Outcome B shows that most new entrants will act as suppliers of more established firms and while they will provide additional domestic output they may not be directly captured as small business subcontractors based on common market practices.



Graphic 1: Potential Outcome Scenarios

2.0 Market Summary with a description of stakeholders

There are various internal and external stakeholders involved in the breeding, training, acquisition, and deployment of military working dogs (MWDs). This information is directly sourced or heavily influenced by the Government Working Dog CIR.

2.1 Internal Stakeholders – The U.S. federal agencies with the most notable Working Dog programs are the Department of Defense (DOD), Department of Homeland Security (DHS), Department of Justice (DoJ) and Department of State (DoS). These departments seek to identify effective and efficient sourcing strategies that would lead to lower cost, minimal administrative burden, and just in time delivery of detection and patrol dogs. The twelve specific organizations within these departments which are considered major government stakeholders within this plan are: U.S. Air Force (USAF), U.S. Army (USA), U.S. Navy (USN), U.S. Marine Corps (USMC), Transportation Security Administration (TSA), Customs and Border Protection (CBP), U.S. Secret Service (USSS), U.S. Coast Guard (USCG), Federal Bureau of Investigation (FBI), Bureau of Alcohol Tobacco Firearms & Explosives (ATF), U.S. Marshals Service, Federal Emergency Management Agency (FEMA), Federal Protective Services (FPS) and State Department.

There are approximately 5,000 working dogs in the current Federal Government inventory. The average working lifespan of these dogs is 7–9 years depending on mission type and climate key factors. The Federal Government spends an average of $80M annually on working dog programs. This spend has increased yearly to enable additional mission requirements. Although the majority of the inventory consists primarily of the same breeds (Belgian Malinois [35%], German Shepherd [33%], and Labrador Retriever [15%]), the demand and authorizations of dogs is significantly different across the Federal Government. Moreover, the performance requirements such as behavioral skills, obedience traits, and level of aggression required varies between agencies due to differences in mission sets and operational demands. Finally, there are significant inconsistencies in the acquisition procedures, working dog training, and sustainment not only between departments but also within agencies. Some of the major discrepancies identified are:

1. Acquisition
    - Each agency has different willingness to pay per dog and uses different contract types and payment methods
    - All agencies are looking for similar dog types but with different specific skill sets
    - There are no existing Government-wide evaluation process standards
    - The skill level of dog handlers and evaluators in each agency have different standards
2. Training
    - The training course, duration, facility, and equipment varies across agencies
    - The skill level of dog trainers and evaluators in each agency vary
3. Sustainment
    - Career path of dog handlers and evaluators varies widely across agencies
    - The government's demand forecast is inconsistent and heavily impacted by funding constraints
    - Variance in operations affects planning and execution of centralized requirements
    - There is no common data tracking system used across Federal Government

This variety of acquisition, training, and sustainment approaches across the departments leads to variance in outcomes. Some firms prefer the individual arrangements offered by one department over another which can lead to internal competition for scarce resources. This plan proposes a standardized 'whole-of-government' approach to marketing the GWD Program to suppliers within the industry to alleviate some of these concerns.

2.2 External Stakeholders – The external stakeholders can be categorized as influencers or suppliers. The influencers are not necessarily the end-users of canines but are entities that have specialized knowledge, authority, or insight that can affect the canine industry. Some of the prominent influencers within the industry are the American Kennel Club (AKC), various breeding associations, and university-sponsored research organizations. Some of the goals of these influencers, not necessarily collectively or all-inclusive, are the fair treatment of animals, domestic industry growth, advancement in the science of breeding, training, and evaluation, as well as decreased reliance on international suppliers. These stakeholder organizations utilize various communication channels such as news articles in print or web media, Facebook postings, appearance and participation at industry events, and formal lobbying to Congress to influence and advocate their positions within the marketplace.

The primary supplier stakeholders within this plan are the domestic breeders, canine trainers, dog importers, and vendors of canines to local, state, and the federal government, larger vendors and resellers, and other similar customers. Some vendors are also involved in the export of canines or have overseas operations that sell canines to foreign parties or governments. The various suppliers identified are driven by profitability, growth, long term relationship with business partners, and fair treatment from their customers. The GWD

Team's market survey identified around 140 unique global suppliers of patrol and detection dogs.

3.0 Market Segmentation (Matrix)

The working dog industry within the United States can be segmented by the level of information and the level of availability of the business entities which exist within the marketplace.

Information: A business entity's familiarity with government contracting and their knowledge of the use and treatment of working dogs by federal departments or agencies.

Availability: Availability is comprised of three components: capability, capacity, and willingness. Capability is a representation of the entity's expertise in breeding, training, or evaluating working dogs. Capacity represents the firm's possible output based on financial, human resource, and equipment constraints. Willingness is a simple measure of whether the firm is willing to conduct business with the government.
The two descriptors, availability and information comprise the axes in the market segmentation chart shown below. Each descriptor has a range from low to high and when segmented the chart shows four quadrants which are described as follows.

Compatibles: The high availability, high information quadrant contains those firms which can be described as compatibles. These firms possess all the capability, capacity, willingness, information, and experience to do business with the government.

Untapped: Those firms which possess a high measure of availability but are low in information are considered untapped meaning that while they have the capability, capacity, and would otherwise be willing to do business with the government they lack the level of information necessary. They may be affected by misinformation or are unaware of the channels available to do government business.

Prospects: Those firms with low relative availability but a high level of information. These firms generally have working knowledge or experience of doing business with the government but may lack sufficient willingness, internal capacity, or the capability to do so.

Incompatibles: The final segment is composed of those firms known as incompatibles. They do not possess sufficient levels of capability, capacity, willingness, information, or experience to participate in government business. They may present as having sufficient information, but such information is inaccurate, misleading, or lacking in full detail. Incompatibles can have a negative effect on other firms through the promulgation of inaccurate information regarding the GWD Program such as issues with the acquisition system or treatment of canines.

These firms possess the potential to be shifted into different quadrants based on changes in their level of information or availability. These shifts within the matrix represent marketing strategy opportunities. The quadrant descriptors are shown in Figure 1 below (See Attachment 2 for a detailed description of the matrix development).

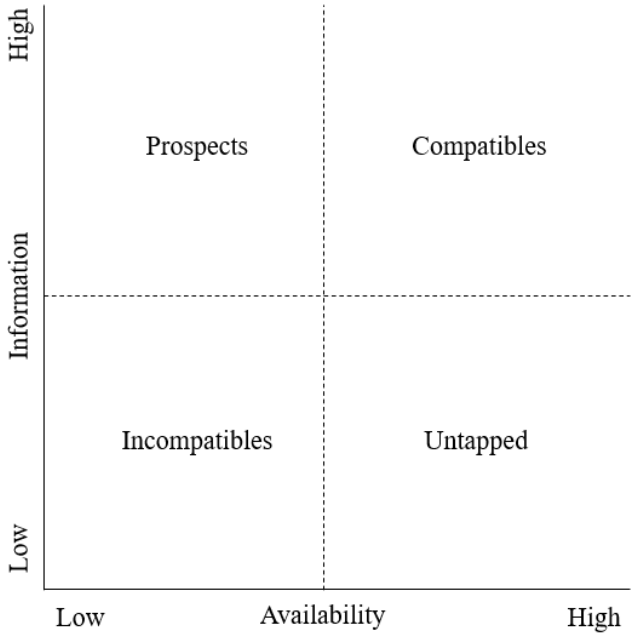


Figure 1: Descriptive Market Segmentation

3.1 Application of the Model

A recent survey conducted in support of the GWD CIR collected responses from a variety of breeders, trainers, and vendors. The data retrieved from this RFI was extracted and analyzed to populate the market segmentation model of the working dog industry described above.
The factors which comprise the Information score are whether the firm has done business with the government, current registration on the System for Award Management, and having the means or access to forecast the government's demand. The availability score is comprised of two main factors: a scale rating of the firm's maximum available output per year as a breeder and/or as a reseller along with the firm's inclusion of the government as a customer. The size of the graphical marker for each firm is based on the firm's average annual revenue. After converting these factors to a relative score, each firm was assigned an Availability score between 0 and 10, and an Information score between 0 and 7 (See Attachment 2 for a detailed explanation). The quadrants were divided based on the estimated medians of the data set. The output of the application of the data set to the model is shown below in Figure 2.

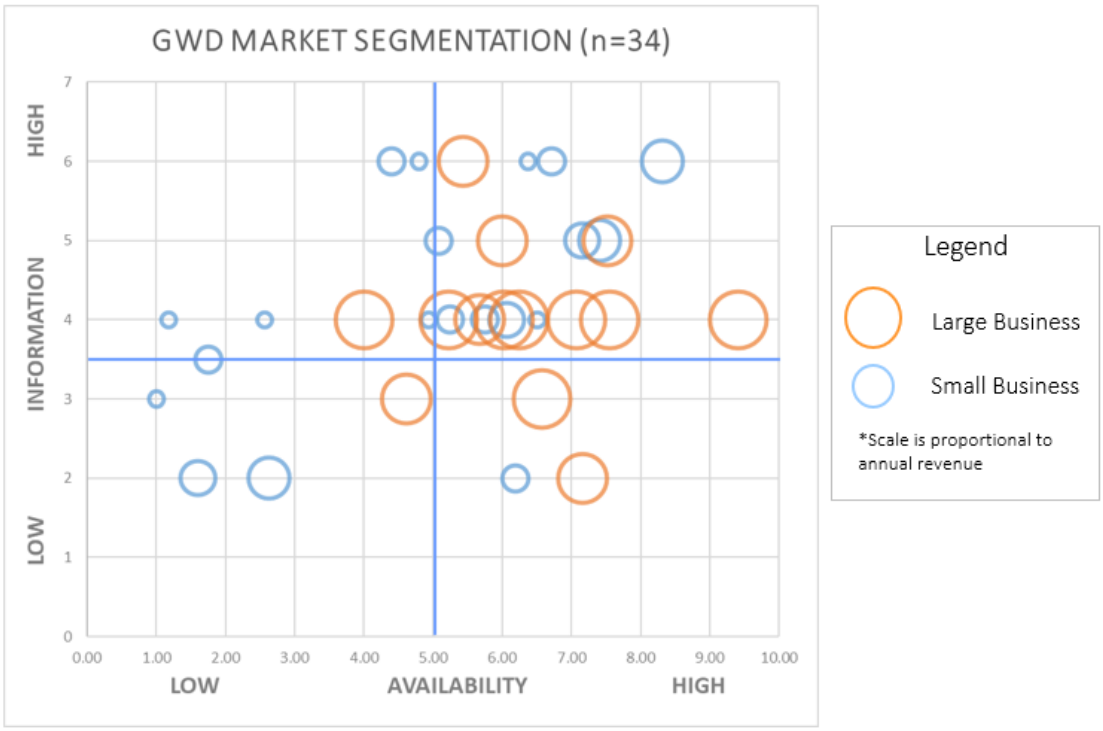


Figure 2: Market Segmentation based upon RFI data set

The fidelity of this model is limited by the fact that a full data set representing all breeders, trainers, and vendors that exist within the market space is unavailable. Due to the limitations in the data the visualization shows that the compatibles quadrant is most likely overrepresented. This is impacted by the collection methodology used within the RFI which generated the data set. This data included mostly vendors already working with the federal government. Our additional research points to the existence of a shadow inventory within the market that cannot be captured through traditional government data gathering techniques. Simply put, firms will not respond to a government request as they are not looking for one. Increased fidelity in the model can be obtained by regularly updating the data set and ensuring that those providing the data inputs provide current, accurate, and complete information.

Using the applicable North American Industry Classification System (NAICS) code of 112990 – All other Animal Production, with a related size standard of $750,000 in annual revenue, the respondents are classified by segmentation and business size as follows in Table 1. There may be instances where a firm falls "on the cusp" of two categories. Using the appropriate strategy, these firms can be shifted from one quadrant to another with relatively little effort.

	Business Size		n=34
Segmentation	Large	Small	Total
Compatible	9	10	19
Incompatible	2	3	5
Prospect	0	6	6
Untapped	1	2	3
On the Cusp	0	1	1

Table 1: Market Segmentation by Business Size

3.2 The Team

To accomplish the stated objectives and in accordance with the U.S. Government-wide Working Dog Program Category Execution Plan, a team lead and team membership should be identified to support this recommended action. The subcategory 3.1 category manager should appoint the GWD Marketing Team Lead (MTL). Each department should provide a representative to act as a GWD Marketing Team Member and provide subject matter expertise as to their departments working dog requirements and objectives. Buy-in from the team membership and government stakeholders will be essential to the effectiveness of the GWD Marketing Team. The team must be lean, well equipped, and empowered to accomplish its mission. The MTL should assign the members of the team responsibility for the performance of the following functions.

Marketing Analysis – The team member assigned this function will be responsible to gather market intelligence, provide interpretation of the data, and insights to support decisions made by the GWD MTL. It is imperative that accurate data be collected and analyzed regularly for decisions to be made based on current, accurate, and complete information. The analysis function will be responsible for coordinating data gathering methods with the outreach/social media specialist to aid in capturing the most accurate data, including the aforementioned shadow inventory data.

Outreach/Social Media Specialization – The team member performing this function will be responsible for managing and executing a combined and cohesive public-facing media campaign across the various departments. They will be responsible for utilizing all relevant social media platforms and managing and updating all government working dog related websites. Additionally, this function will be responsible for providing unstructured data to the marketing analysis function as requested and for providing advice on noted trends.

Marketing Coordination – The team member performing this function will be responsible to facilitate all events such as interviews, appearances at industry events, and the distribution of materials and other resources. They will act as a primary logistical link to synchronize resources from the Small Business Administration (SBA) with the efforts of the marketing team.

Brand Representation – The team member responsible for this function will act as the public affairs "face" of the GWD program and provide representation at industry events, conferences, and other media appearances as coordinated by the Marketing Coordinator. They will be responsible for promoting the positive impact that domestic sources of working dogs have on the various missions of the departments.

The team may receive support from other functionals such as contracting, finance, public affairs, or legal as required. This support could be sourced from the resources available to the subcategory 3.1 category manager. In an ideal state, each of these activities should be accomplished by a devoted team member whose primary duty is to perform the critical functions of the GWD SBCP.

4.0 Communication Strategy Summary

The GWD SBCP will establish and maintain open lines of communication between the vendor/breeder base with the DOD through print and digital communication, attendance and participation at industry events, as well as providing resources and tools to connect new market entrants with government procurement entities.

4.1 Marketing Channels

The working dog industry acts as an insular and self-reinforcing body. Most of the communication is conducted directly from company to company through personal correspondence. There are several prominent trade shows, conferences, and industry events, such as the yearly AKC U.S. Detection Dog Conference. These events reinforce the prevalent direct correspondence through the formation of interpersonal networks between breeders, trainers, and vendors of varying size and experience. A number of firms have a robust social media presence. Additionally, some have well-established websites to advertise their services and reach prospective clients and suppliers.

4.2 Target Marketing statement for each quadrant

The marketing activities described within the GWD SBCP represent strategies intended to move firms within the industry from one market segmentation to another as shown by the arrows in Figure 3 below (This figure shows a sample data set, to include the anticipated shadow inventory, for illustrative purposes only). These activities are focused on achieving the primary objectives of increasing public awareness of GWD programs, improving relationships between government and industry, and providing tools and resources to industry to facilitate greater participation in federal working dog programs.

Compatibles – The marketing activities will address the firms within the Compatibles quadrant by providing a dynamic feedback loop that encourages a continuous exchange of information between firms and the government. These activities will keep Compatibles from falling into the Untapped or Prospects quadrants. Supplier relationship management is critical for these firms.

Prospects – The marketing activities will serve the firms within the Prospects quadrant by providing tools, networks, and resources to encourage and promote doing business with the government or the firm acting as a supplier to the Compatibles. These activities will help increase the Prospect's availability to move into or closer to the Compatible quadrant. With the infusion of additional resources such as financial assistance for expansion and access to training resources firms within this quadrant may be moved laterally along the availability axis.

Untapped – The marketing activities will serve the firms within the Untapped quadrant by effectively changing the narrative of doing business with the government and correcting any misinformation about the treatment of canines in the GWD program through effective dissemination of current, accurate, and complete information. This increase in information will promote movement between the Untapped quadrant and the Compatibles quadrant.

Incompatibles – The marketing activities will influence this quadrant by promoting a decrease in inaccurate information, increasing the relative experience of the firms with government procurement, and improving capability, capacity, and willingness to do business with the government. Some incompatibles may be converted to Prospects or Untapped. For those incompatibles that will simply never support the GWD program, these activities will mitigate the risk of negative spill-over of intentionally or unintentionally influencing firms in other quadrants from doing business with the Government. This blocking action is represented by the solid line blocking the downward red arrow in Figure 3 below.

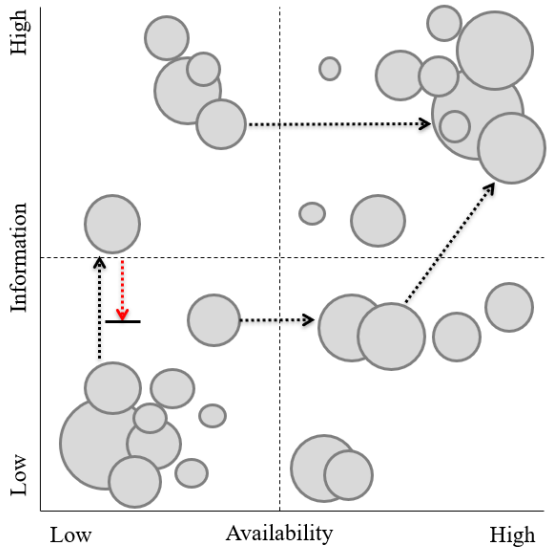


Figure 3: Marketing Activities Illustrative Strategic Implementation

4.3 Marketing Activities

Three categories of marketing activities should be utilized to accomplish the primary objectives of the GWD SBCP[1] (note: all activities below will support Objective 4 through a consistent whole-of-government GWD message). Suggested milestones and metrics for the following marketing activities are shown in Table 2 contained within Attachment 4 at the conclusion of this document.

4.3.1 Print/Digital Media – Increase public awareness of GWD programs using print and digital media.

4.3.1.1 Participate in Interviews for Magazines, Websites, and other News Sources

GWD Program representatives and GWD Marketing Team Members should participate regularly in interviews for news organizations, industry magazines or periodicals, websites, and other news sources. This will increase awareness of the GWD Program along with its objectives among interested parties within the market space. This will lead to the accomplishment of Primary Objective 1 by increasing general awareness while also providing a forum to introduce other marketing activities such as the proposed GWD Program website and available tools and resources consistently with a whole-of-government message.

4.3.1.2 Deploy a GWD Program website

To facilitate a centralized repository of standardized information across all departments a single "one-stop-shop" website should be deployed and maintained. This website will provide access to a range of easily understood information addressing working dog procurement programs, available resources for small businesses, a feedback system to maintain an open line of communication with industry, vignettes showing working dogs in action, access to the latest in current research and news surrounding working dogs, as well as information on their history and usage. The website will be the primary linkage between the various social media platform such as Facebook, Twitter, LinkedIn, YouTube, Pinterest, and Instagram.

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[1] Objectives:

1. Increase small business awareness and participation in GWD programs
2. Improve relationships between government and industry
3. Provide tools and resources to industry to facilitate greater participation in federal working dog programs
4. Create reliable and consistent messaging for the GWD program that reflects the realistic expectations and experiences of public and private stakeholders

This activity address Primary Objective 1 by providing means for the industry to access current, accurate, and complete information focused on working dogs and their procurement, use, and disposition within the GWD Program. It also addresses Primary Objective 2 by creating a forum through which firms can raise their concerns and receive timely responses from government representatives. Additionally, Primary Objective 3 is addressed as the website will have access to resources such as readily available contact information, explanatory information about the procurement process, and access to standardized breeding and training recommendations.

If used effectively this website primarily offers the capability to move incompatibles to prospects or untapped to compatibles. It can also move prospects to compatibles. This can be accomplished by providing both accurate information and increased awareness as well as tools and resources to increase capacity or capability. Additionally, it can help to prevent the movement of prospects to incompatibles by preventing misinformation and resolution of negative outcomes through the proposed feedback measures.

4.3.2 Attendance at Industry Events – Raise awareness and improve relationships through attendance at industry events and partnerships with industry associations.

4.3.2.1 Attend and participate in industry events

Representatives from the GWD Program as well as the GWD Marketing Team should regularly attend industry events such as conferences sponsored by AKC, trade shows organized by specific breeding clubs, and webinars led by various canine organizations to raise awareness and improve relationships with the working dog industry. Representatives should accept opportunities to participate in panel discussions and networking activities at these events. This face-to-face activity is vital to removing some of the negative images attached to the government as well as creating lines of communication with the vendor base. This will be especially effective with those firms which are low in information.

This activity will address all Primary Objectives.

4.3.2.2 Partner with Industry Associations to host events

The GWD Team should team up with industry associations such as the AKC to lead events like the detector and patrol dog competition. These events are useful to breeders as a means of evaluating and validating their canine's performance and training methods utilized. Recognition from a nationally recognized kennel club as well as the government can be used as an indication

of merit, as it indicates that the dog and the training methodologies have been found to be superior among competitors.

This activity will increase general awareness as well as interest from the industry on producing quality working dogs that meet the government's needs. This type of event could promote improved relationships between the government and industry by enabling a direct feedback loop while also being able to act as a venue for the evaluation of canines for selection.

This activity will address all Primary Objectives.

4.3.3 Tools and Resources – Tools and resources will be made available to firms within the industry to promote increased participation with the GWD Program.

4.3.3.1 Tools

Tools should be made available through the proposed GWD Program website which covers the acquisition process for working dogs, information for firms on becoming registered to do business with the government, address government requirements for working dogs, a description of the process from breeding to the disposition of a working dog and provide a means of delivering feedback to the GWD Program.

These tools will directly address Primary Objective 3 and will help to convert incompatibles to either Untapped or Prospects.

4.3.3.2 Resources

Resources should be made available in several forms to interested firms. Monetary assistance through the SBA should be available to support small business breeders or trainers to start up their operations or expand their efforts. Additionally, experts should be made available to assist with basic to advance levels of breeding, training, and selling canines. Finally, training facilities should be offered to the GWD Program participants to encourage the socialization of dogs.

This activity will address Primary Objectives 1, 2, and 3.

4.4 Consistency of Message - To be able to ensure consistency of message and synergy of effort the execution of the activities described above should be planned, coordinated, and conducted to address a government-wide marketing approach. To address the disparity between departments and agencies it is important that a "single voice" concept be promoted. This should be focused not only on guaranteeing consistency of message between the various marketing activities but also synchrony between the various organizations procuring, training, and utilizing working dogs throughout the federal government.

4.4.1 Government-wide Branding

One of the most critical aspects of the marketing plan is to have a branding package that will represent the GWD program and be utilized by all parties operating within the program. The branding must be incorporated throughout every marketing activity. The use of consistent branding can help to change the way the public perceives the GWD program. The messaging utilized by the branding can be used to signify the unity between government agencies, increase pride to all dog breeders and owners, and evoke patriotism amongst stakeholders while mitigating the idea that working dogs are only used for violence and fear.

This activity will address Primary Objective 4.

5.0 Conclusion

Firms involved in the working dog industry face two major decision points when evaluating doing business with the government. The first is whether they will pursue doing business with the government. The second is whether they will agree to the terms of their proposed individual arrangement with the government. This plan only addresses the first major decision point and not the second. Without the prospects of a beneficial long-term business relationship firms will reject the efforts of this plan and consider the government disingenuous in its stated goal to improve domestic participation within the working dog industry. For a cohesive and consistent message, both aspects must be addressed in concert. Further, the GWD program must maintain vigilance over the outcome model (A or B) that manifests in the market and adjust accordingly. While current GWD program marketing efforts have varied greatly across the govern this marketing plan attempts to address the full spectrum of the federal government's approach to marketing within the working dog industry. For the federal government to achieve its long-term objectives there must be a shared, standardized, sustainable, and transferrable vision regarding the procurement, use, and disposition of working dogs.

Attachment 1.
Definition of Terms - Adapted from the Category Intelligence Report (CIR).

To facilitate an accurate understanding of the language utilized within this plan we present a brief explanatory definition of terms.

Breeders – Individual or firm that breeds canines

Detection Dog – Canine which specializes in the detection of explosives, drugs, currency, and other specialized missions (e.g., cadaver)

Green Dog – this definition varies; however, within this document we refer to a minimally trained dog that possesses basic obedience and drive skills. Usually aged between 12–18 months at the time of purchase

Patrol Dog – Canine which is trained in controlled aggression skills (or "bite" work)
Trainer – Individual that train canines in basic or specialized skills
Vendors – Individuals or firms that sell dogs to a trainer, end-user, or another vendor/ reseller

Attachment 2.
Background information detailing the development of the GWD Market Segmentation Model

The data collected from the RFI in support of the GWD CIR was analyzed and converted into scores to populate the market segmentation quadrants.

1.0 Information Score

The factors which comprise the Information score are current registration on the System for Award Management and having the means or access to forecast the government's demand. Below are the conversions of responses to scores:

Is your company currently registered in the System for Award Management (SAM)?
Yes = 1
No = 0
How does your company determine the demand forecast of the market when considering the number of working dogs to breed?
Entered means of forecast = 1
No means of forecast = 0

2.0 Availability Score

The availability score is comprised of the firm's maximum available output per year as a breeder and/or as a reseller. These values were calculated using the firm's maximum capacity (as a breeder and as a reseller) multiplied by their success rate in selling the canines as working dogs. To normalize these values, each of their output scores was divided by 100.

3.0 Other Factors

The following scores were both added to the firm's Information and Availability Scores.

Who are your predominant customers for working dogs?
Response includes government agency = 1
Response includes private protection firms using working dogs but no indication of government agency customers = 0.5
Response does not include either of the above (Usually will be sales to only private individuals = 0

Has your company done or are you currently doing business with the U.S. Government?
Yes, currently doing business = 1
Yes, but not currently = 0.5
No = 0

The size of the graphical marker for each firm is based on the firm's average annual revenue.

Less than $100,000 = 0.10
$100,000 - $249,000 = 0.25
$250,000 - $399,000 = 0.40
$400,000 - $549,000 = 0.55
$550,000 - $750,000 = 0.75
Greater than $750,000 = 1.0

After converting these factors to relative scores, the values were added to assign each firm with an Availability score between 0 and 10, and an Information score between 0 and 7. The quadrants were divided based on the estimated medians of the data set. The summary of the calculation of the data set is shown in the table below.

			BREEDERS/TRAINER SCORE				TRAINERS/RESELLER SCORES				GENERAL AWARENESS	
Business Size (Scale in $1M)	Availability Score (X)	Information Score (Y)	Species Bred	Canine Sold	Demand Forecast	Gov Supplier	Species Purchsed	Canine Sold	Demand Forecast	Gov Supplier	SAM Registration	Conducted Business w/ Gov
1	9.41	4	0	0	1	0	4	441	0	1	1	1
1	7.55	4	0	0	1	0	4	255	0	1	1	1
1	7.52	5	4	115	1	1	3	37	1	1	1	0
1	7.07	4	0	0	1	0	4	207	0	1	1	1
1	6.58	3	0	0	1	0	4	158	0	1	0	1
1	6.24	4	0	0	1	0	4	124	0	1	1	1
1	6.03	4	0	0	1	0	3	203	0	1	1	1
1	6.00	5	1	0	1	1	4	0	1	1	1	0
1	5.43	6	2	38	1	1	3	5	1	1	1	1
1	5.23	4	0	0	1	0	3	123	0	1	1	1
1	4.00	4	0	0	1	0	3	0	0	1	1	1
1	0.00	1	0	0	0	0	0	0	0	0	0	1
1	0.00	2	0	0	0	0	0	0	0	0	1	1
1	0.00	1	0	0	0	0	0	0	0	0	1	0
0.75	8.32	6	2	64	1	1	4	168	1	1	1	1
0.75	7.40	5	3	18	1	1	4	123	1	1	1	0
0.75	7.16	2	0	0	1	0	4	216	0	1	0	0
0.75	5.68	4	0	0	1	0	4	68	0	1	1	1
0.75	4.62	3	0	0	1	0	3	62	0	1	1	0
0.55	7.15	5	2	15	1	1	4	100	1	1	1	0
0.55	2.63	2	0	0	1	0	1	63	0	1	0	0
0.55	0.00	2	0	0	0	0	0	0	0	0	1	1
0.4	6.71	6	2	15	1	1	4	56	1	1	1	1
0.4	6.06	4	0	0	1	0	4	106	0	1	1	1
0.4	1.60	2	1	60	0	0	0	0	1	0	1	0
0.25	6.38	6	4	26	1	1	4	11	1	1	1	1
0.25	6.19	2	0	0	1	0	4	119	0	1	0	0
0.25	5.75	4	0	0	1	0	4	75	0	1	1	1
0.25	5.25	4	0	0	1	0	4	25	0	1	1	1
0.25	5.08	5	3	4	1	1	3	4	1	1	1	0
0.25	4.40	6	2	20	1	1	2	20	1	1	1	1
0.25	1.75	3.5	0	0	1	0	1	25	0	0.5	1	1
0.1	6.50	4	4	38	1	1	4	13	1	1	0	0
0.1	4.94	4	3	94	0	1	0	0	1	0	1	1
0.1	4.80	6	1	60	1	1	2	20	1	1	1	1
0.1	2.57	4	1	57	0	1	0	0	1	0	1	1
0.1	1.18	4	1	8	1	0	1	10	1	0	1	1
0.1	1.00	3	1	0	0	0	0	0	1	0	1	1
0.1	0.00	1	0	0	0	0	0	0	0	0	1	0

Appendix 2 Table 1. Summary of Market Segmentation Score Calculations

Attachment 3
Marketing Activities suggested Milestones, Metrics, Contacts, Events, and News Outlets

Participate in Interviews for Magazines, Websites, and other News Sources

Milestones	Metrics	Suggestions
As setting a specific number of interviews within a given time range as a milestone is not realistic given changing societal and political pressures the GWD Program representatives and GWD Marketing Team Members should seek to have regular interactions with media representatives.	The success of this activity will be measured by readership and circulation. Circulation is the number of copies or publications circulated to the public. Readership is the number of readers over a certain period of time.	AKC Gazette, Police K9 Magazine, Working Dog Magazine, Warrior Dog Foundation, American Humane, American Kennel Club

Deploy a GWD Program Website

Milestones	Metrics	Suggestions
Within six months of the formation of the GWD Marketing Team this website should be fully deployed. The GWD marketing team will be responsible for the maintenance and upkeep of this public facing marketing tool.	The success of the GWD Program Website can be judged on several metrics including website traffic, feedback tool activity, open forum entries, and resources accessed.	https://www.accamic.com/ https://rise.articulate.com/share/LhiyMOC2zTyHNHzqb-PFR3UNhsfbzukW#/

Attend and participate at industry events

Milestones	Metrics	Suggestions
The Marketing Coordinator should plan for a team to travel, funds and mission permitting, and schedule attendance at a minimum of two industry events per year for representatives as appropriate.	This activity can be measured through participant registrations for the event and sponsorship activities.	AKC National Tracking Invitational, Hard Surface K9 Tracking Seminar, Marathons/5Ks

Partner with Industry Associations to host events

Milestones	Metrics	Suggestions
The first event hosted by the GWD Program should be schedule the following year after the formation of the GWD Marketing Team.	The success of this activity can be measured by the number of participants and evidence of participants' support and desire on making this a recurring event.	AKC National Tracking Invitational, Hard Surface K9 Tracking Seminar, Marathons/5Ks

Tools

Milestones	Metrics	Suggestions
The tools described should be fully available with the deployment of the proposed website. Updates to the tools should be made as needed to ensure the most accurate and up to date information is provided to firms.	The success of this activity can be measured by website traffic, feedback tool activity, and resources accessed.	Process Map, Guide to federal acquisition/doing business with the government

Resources

Milestones	Metrics	Suggestions
The information and links to these resources should be fully available with the deployment of the proposed website.	The success of this activity can be measured by website traffic, feedback tool activity, and resources accessed.	POCs, SBA contacts

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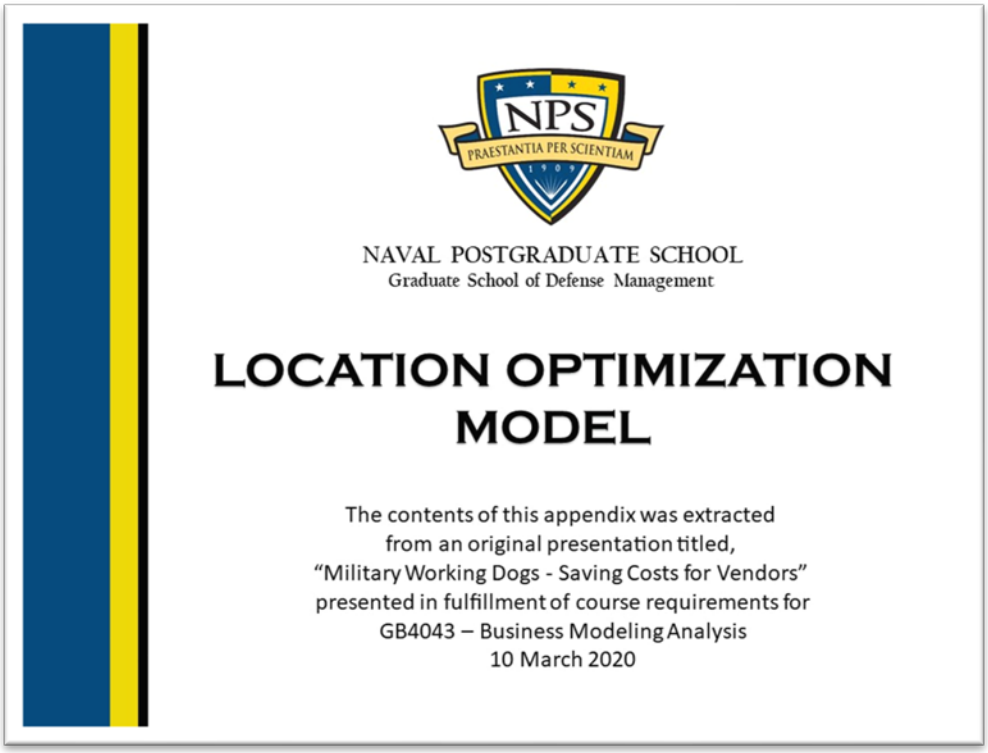
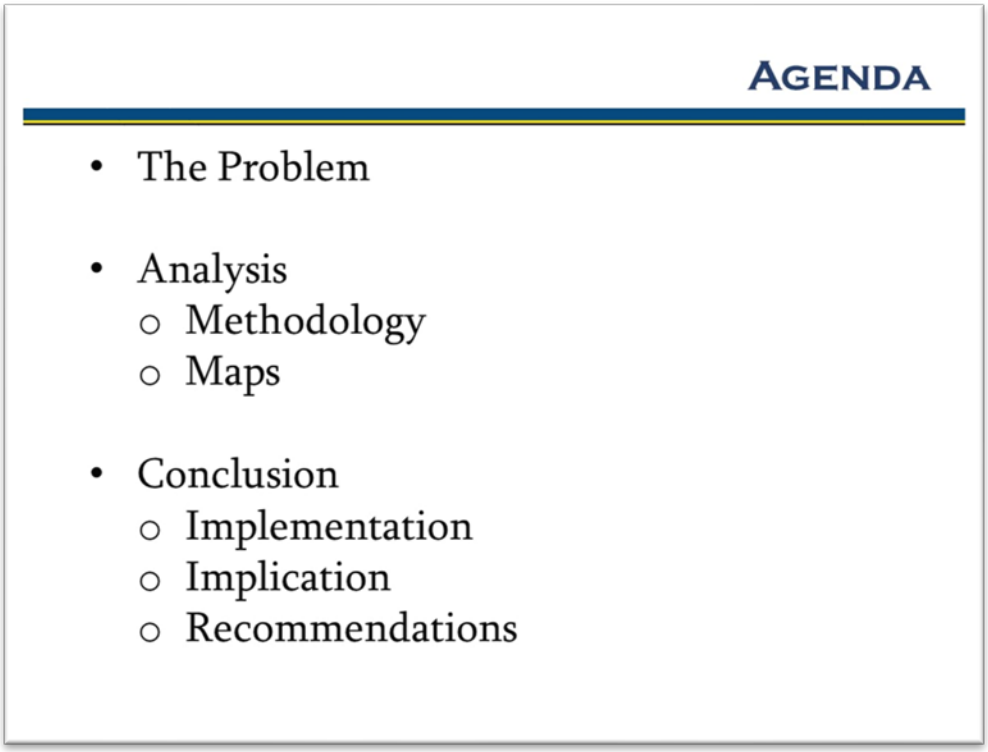
APPENDIX F. LOCATION OPTIMIZATION MODEL



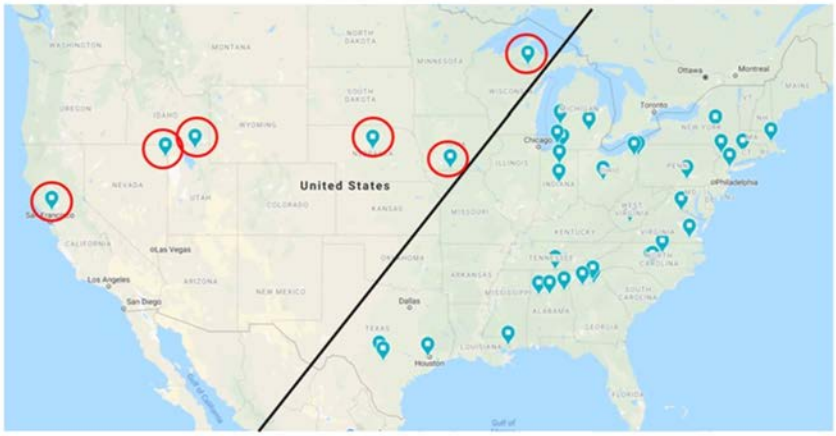


The Problem

MWD vendors are required to transport their dogs to Lackland AFB. This requirement serves as a significant barrier to enter the MWD market due to the high transportation costs.

Analysis- Methodology

- Analyzed problem to select best model – Set covering model
- Collected Data:
  - ID'd MWD vendors and eliminated outliers (37)
  - ID'd Air Force bases with cargo lift capability (24)



Analysis- Creating the Model

Determined Decision Variables

- Yi: Base Selection
  Yi = 1 if i is selected (i=Base A,B,C...X)
  = 0 otherwise

Objective Function

- Minimize number of selection sites:
  Min: $Y_A + Y_B + Y_C + \ldots Y_X$

Set Constraints

- The binary table identifies which bases are within 300 miles from each of the vendors
- Lackland AFB must be one of the selection sites
- Each vendor can bring their dogs to at least one of the bases

Analysis- Methodology

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Used	Sign	Available
1	0	0	0	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
2	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	>=	1
3	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	>=	1
4	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	>=	1
5	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	>=	1
6	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	1	0	1	0	0	0	1	0	0	0	>=	1
7	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	0	>=	1
8	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	0	>=	1
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
10	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	>=	1
11	0	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	>=	1
12	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	>=	1
13	1	0	1	0	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	0	>=	1
14	1	0	1	0	1	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1	1	1	0	0	>=	1
15	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	>=	1
16	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	>=	1
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
19	0	0	0	1	0	1	0	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	>=	1
20	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	>=	1
21	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
22	0	0	0	1	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	>=	1
23	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	>=	1
24	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	>=	1
25	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	0	0	>=	1
26	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	1	0	0	0	>=	1
27	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	>=	1
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	>=	1
29	1	0	1	0	1	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	>=	1
30	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	>=	1
31	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	>=	1
32	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	1	0	0	0	>=	1
33	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	0	0	0	>=	1
34	0	1	0	1	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	>=	1
35	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	0	0	>=	1
36	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	>=	1
37	0	0	0	1	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	>=	1
																									1	=	1

Used max miles (300mi) to create binary constraint table

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
300 miles	7	179 miles	38,596 miles

Selected Bases:

1. JB McGuire-Dix, NJ
2. Wright-Patt AFB, OH
3. Greater Peoria, IL
4. Savannah IAP, GA
5. Charlotte, NC
6. Maxwell AFB, AL
7. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
350 miles	5	207 miles	37,092 miles

Selected Bases:

1. Wright-Patt AFB, OH
2. Maxwell AFB, AL
3. New Castle County ANGB, DE
4. Savannah IAP, GA
5. JBSA Lackland, TX

RESULTS OF MODEL

Mileage	# of Bases	Avg Distance	Total Mileage Saved
400 miles	5	183 miles	37,954 miles

Selected Bases:

1. Stewart ANG Base, NY
2. Charlotte, NC
3. Maxwell AFB, AL
4. Youngstown ARS, OH
5. JBSA Lackland, TX

RESULTS OF MODEL

Mileage	# of Bases	Avg Distance	Total Mileage Saved
450 miles	4	251 miles	35,327 miles

Selected Bases:

1. Dover AFB, DE
2. Maxwell AFB, AL
3. Louisville IAP, KT
4. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
500 miles	4	236 miles	35,884 miles

Selected Bases:

1. JB Mcguire-Dix, NJ
2. Dobbins ARB, GA
3. Louisville IAP, KT
4. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
550 miles	4	236 miles	35,888 miles

Selected Bases:

1. Dobbins ARB, GA
2. Schenectady MAP, NY
3. Yeager Airport, WV
4. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
600 miles	4	273 miles	34,529 miles

Selected Bases:

1. Dover AFB, DE
2. Charlotte, NC
3. Yeager Airport, WV
4. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
650 miles	3	334 miles	32,271 miles

Selected Bases:

1. Martinsburg, WV
2. Keesler AFB, MS
3. JBSA Lackland, TX

Results of Model

Mileage	# of Bases	Avg Distance	Total Mileage Saved
700 miles	3	313 miles	33,039 miles

Selected Bases:

1. Martinsburg, WV
2. Charlotte, NC
3. JBSA Lackland, TX

Summary of Results

Mileage Constraint	# of Bases	Avg Distance	Total Mileage Saved
300 miles	7	179 miles	37,999
350 miles	5	207 miles	37,092
400 miles	5	183 miles	37,954
450 miles	4	251 miles	35,327
500 miles	4	236 miles	35,884
550 miles	4	236 miles	35,888
600 miles	4	273 miles	34,529
650 miles	3	334 miles	32,271
700 miles	3	313 miles	33,039

Our Recommendation

Implementation:

- To reduce MWD vendors transportation cost we will advocate for the AF MWD program to establish selection sites.

Implications:

- By adding the optimal number of selection sites, we will minimize the MWD vendors' transportation costs and incentive domestic breeders/vendors to supply the DoD market segment.

Recommendation for Future Research:

- Determine the costs to establish a selection site at each possible base.
- Validate travel distances with vendors.
- Expand model to cover outliers by establishing regions.

Summary

- The Problem
- Analysis
  - Methodology
  - Maps
- Conclusion
  - Implementation
  - Implication
  - Recommendations

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